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***The Trusted Integrator for Sustainable Solutions***

REMOVAL SUPPORT TEAM 2  
EPA CONTRACT EP-W-06-072

November 26, 2013

Ms. Kimberly Staiger, On-Scene Coordinator  
U.S. Environmental Protection Agency, Region II  
Removal Action Branch  
2890 Woodbridge Avenue  
Edison, NJ 08837

**EPA CONTRACT No.: EP-W-06-072**

**TDD No.: TO-0029-0104**

**DOCUMENT CONTROL No.: RST 2-02-F-2620**

**SUBJECT: FINAL SITE-SPECIFIC HEALTH AND SAFETY PLAN – BARTH  
SMELTING CORP. SITE, NEWARK, ESSEX COUNTY, NEW JERSEY**

Dear Ms. Staiger,

Enclosed please find the Final Site-Specific Health and Safety Plan (HASP) for the Removal Action to be conducted at the Barth Smelting Corp. Site located in Newark, Essex County, New Jersey beginning on December 2, 2013. The U.S. Environmental Protection Agency comments regarding the Draft Site-Specific HASP have been incorporated. If you have any questions or comments, please do not hesitate to contact me at (732) 570-4997.

Sincerely,  
Weston Solutions, Inc.

*For* Aleksandra Mallon  
RST 2 Site Project Manager

Enclosure

cc: TDD File No.: TO-0029-0104

**REGION II RST 2 HEALTH AND SAFETY PLAN  
EMERGENCY RESPONSE/REMOVAL ASSESSMENT/REMOVAL ACTION  
(Revised 16 March 2011)**

**TDD No.** TO-0029-0104

**Site Name:** Barth Smelting Corp.

**Site Address:** Street: 99 Chapel Street  
City: Newark  
County/State: Essex/New Jersey

**Directions to Site from Office:** (Color Map Following This Page)

1090 King Georges Post Rd  
Edison, NJ 08837

- |   |         |
|---|---------|
| 1. Head west toward King Georges Rd/King Georges Post Rd                      | 302 ft  |
| 2. Turn right onto King Georges Rd/King Georges Post Rd                       | 1.8 mi  |
| 3. Slight right onto the ramp to I-95 N/New Jersey Turnpike                   | 1.1 mi  |
| 4. Keep right at the fork, follow signs for New Jersey Turnpike N (toll road) | 15.6 mi |
| 5. Take New Jersey Turnpike N to Exit 15E                                     | 0.4 mi  |
| 6. Take Exit 15 E toward Newark/Jersey City                                   | 0.2 mi  |
| 7. Keep left at fork, follow signs for US 1/US 9 (Truck Rout)/Raymond Blvd    | 0.5 mi  |
| 8. Keep right at fork, follow signs for Raymond Blvd.                         | 0.2 mi  |
| 9. Slight left onto Raymond Blvd.   | 0.7 mi  |
| 10. Turn right onto Chapel St.  | 0.2 mi  |

Destination is 20.7 miles = 30 minutes.



Newark Zinc Company. The 99 Chapel Street portion of the Site is currently occupied by various maritime shipping and maintenance facilities. A playground and grass-covered play area are located on housing authority property just beyond the fence that separates the 99 Chapel Street portion of the Site and the apartment complex.

On December 3, 2012, Weston Solutions, Inc., Removal Support Team 2 (RST 2) conducted field screening activities for lead-based paint for playground equipment at the Terrell Homes playground located adjacent to the 99 Chapel Street portion of the Site. Field screening for lead in playground equipment paints was conducted using a portable X-ray fluorescence (XRF) analyzer. A total of 13 lead readings, including two to three readings for each of the playground equipment and cinderblock wall located next to the playground, were recorded. Based on the field screening results, lead was detected at concentrations ranging from 0.01 to 0.19 milligrams per square centimeter ( $\text{mg}/\text{cm}^2$ ) at two of the three playground equipment pieces analyzed. No lead was detected in paints for one of the three playground equipment pieces analyzed. Lead was detected at a concentration of  $0.01 \text{ mg}/\text{cm}^2$  at one of the screening locations on the cinderblock wall located behind the play area. The U.S. Department of Housing and Urban Development (HUD) *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*, dated July 2012, Action Level for lead in paint is  $1 \text{ mg}/\text{cm}^2$ .

From December 3 through 6, 2012, the U.S. Environmental Protection Agency (EPA), Region II Pre-Remedial Program collected a total of 150 surface and subsurface soil samples from the Terrell Homes playground, adjacent to the former Barth Smelting Corp. facility; from two residential properties along Chapel Street; and from two background locations believed to be outside of the influence of former site activities. At each sample location soil samples were collected at depth intervals of 0-1 inches, 1-6 inches, 6-12 inches, 12-18 inches, and 18-24 inches. A total of 14 soil samples, including one field duplicate, and two rinsate blank samples were submitted for laboratory analysis. All samples were sent to the EPA Division of Environmental Science and Assessment (DESA) laboratory located in Edison, New Jersey for target analyte list (TAL) metal, including mercury and tin, analysis.

RST 2 conducted three additional sampling events on March 29 and April 1, 2013, May 15 and 16, 2013, and August 14, 2013 at the Site to assess the extent of contamination at both 99 Chapel Street and the Terrell Homes property. RST 2 collected a total of 166 soil samples, including nine field duplicates, from the Terrell Homes portion of the Site. In May 2013, RST 2 collected a total of 155 additional soil samples from the grassy area adjacent to the Community Building at Terrell Homes. In August 2013, RST collected a total of 11 soil samples, including one field duplicate, from the grass-covered area located southeast of the Terrell Homes/99 Chapel Street property boundary.

Soil sample analytical results for the March/April 2013 sampling event indicated the presence of lead at concentrations that exceed the New Jersey Department of Environmental Protection's (NJDEP) Residential Direct Contact Soil Cleanup Criteria (RDCSCC) of 400 milligrams per kilogram ( $\text{mg}/\text{kg}$ ) in 24 samples collected from 17 of the soil borings; these elevated concentrations ranged up to  $1,600 \text{ mg}/\text{kg}$ . Antimony, arsenic, copper, manganese, thallium, vanadium, zinc, and mercury were also detected above their respective NJDEP RDCSCC in some of the samples. Soil sample analytical results for the May 2013 sampling event indicated the presence of lead at concentrations that exceed the NJDEP's RDCSCC of  $400 \text{ mg}/\text{kg}$  in six samples collected from six of the soil borings at concentrations ranging from  $420 \text{ mg}/\text{kg}$  to  $2,400 \text{ mg}/\text{kg}$ . Antimony, arsenic, cadmium, copper, manganese, and zinc were also detected above

their respective NJDEP RDCSCC in some of the samples. Average XRF field screening levels for lead that exceeded NJDEP's RDCSCC ranged from 405 parts per million (ppm) to 2,330 ppm. Soil sample analytical results for the August 2013 sampling event indicated the presence of lead at concentrations that exceed the NJDEP RDCSCC of 400 mg/kg in all 11 samples collected from the five sample locations; these elevated concentrations range from 1,200 mg/kg to 9,800 mg/kg. Arsenic, cadmium, copper, manganese, and zinc were also detected at concentrations above their respective NJDEP RDCSCC.

### **RST 2 Scope of Work:**

As part of the Removal Action, RST 2 has been tasked to provide contractor oversight, site documentation, real-time perimeter air monitoring for particulates, and the collection of perimeter air samples for lead dust. RST 2 will monitor for particulates utilizing DustTrack particulate monitors and sample for lead dust utilizing GilAir pumps. The air monitoring and sampling will be conducted in conjunction with the Emergency Removal and Response Services (ERRS) contractor excavation and removal activities. In addition, RST 2 has been tasked with the collection of up to 50 post excavation soil samples for TAL metal, including quality assurance/quality control (QA/QC) sample analysis.

### **Four (3) S.M.A.R.T. Health and Safety Goals for the Project (Simple, Measurable, Actionable, Reasonable, & Timely):**

1. Dress appropriately and work safely taking periodic breaks during cold weather conditions.
2. Be cautious of slip, trip, and fall hazards, especially while working in and around uneven ground surfaces.
3. Safe working practices around the excavator which includes constant communication and eye contact with the operator during the excavations and sampling. Make sure to always be wearing safety equipment and be careful when working around machinery.

### **Incident Type:**

- ☐ Emergency Response
- ☐ Removal Assessment
- ☒ Removal Action – Beginning December 2, 2013
- ☐ Soil Sampling
- ☐ PRP Oversight
- ☐ Other

**Location Class:**

- ☒ Industrial
- ☐ Commercial
- ☒ Urban/Residential
- ☐ Rural

U.S. EPA OSC: Kimberly Staiger

Original HASP: Yes

Lead RST 2: Aleksandra Mallon

Date of Initial Site Activities: 12/2/2013

Site Health & Safety Coordinator: Aleksandra Mallon

Site Health & Safety Alternate: Not Applicable

**Response Activities/Dates of Response** (fill in as applicable)

**Emergency Response:**

- ☐ Perimeter Recon -
- ☐ Site Entry -
- ☐ Visual Documentation -
- ☐ Multi-Media Sampling -
- ☐ Decontamination -

**Removal Assessment:**

- ☐ Site XRF Screening -
- ☐ Site Entry -
- ☐ Visual Documentation -
- ☐ Multi-Media Sampling -
- ☐ Decontamination -

**Removal Action:**

- ☒ Perimeter Recon – Beginning December 2, 2013
- ☒ Site Entry – Beginning December 2, 2013
- ☒ Visual Documentation - Beginning December 2, 2013
- ☒ Multi-Media Sampling – Beginning December 2, 2013
- ☒ Decontamination – Beginning December 2, 2013

## Physical Safety Hazards to Personnel:

- |   |   |  |
|---|---|--|
| <input checked="" type="checkbox"/> Inclement Weather – Attach FLD02          | <input type="checkbox"/> Heat – Attach FLD05                          | <input checked="" type="checkbox"/> Cold – Attach FLD06                  |
| <input type="checkbox"/> Confined Space – Attach FLD08                        | <input type="checkbox"/> Industrial Trucks – Attach FLD09             | <input type="checkbox"/> Manual Lifting – Attach FLD10                   |
| <input checked="" type="checkbox"/> Terrain – Attach FLD11                    | <input type="checkbox"/> Structural Integrity – Attach FLD13          | <input checked="" type="checkbox"/> Site Security                        |
| <input type="checkbox"/> Pressurized Containers, Systems – Attach FLD16       | <input type="checkbox"/> Use of Boats – Attach FLD18                  | <input type="checkbox"/> Waterways – Attach FLD19                        |
| <input type="checkbox"/> Explosives – Attach FLD21                            | <input checked="" type="checkbox"/> Heavy Equipment – Attach FLD22    | <input type="checkbox"/> Aerial Lifts and Manlifts – Attach FLD24        |
| <input type="checkbox"/> Elevated Surfaces and Fall Protection – Attach FLD25 | <input type="checkbox"/> Ladders – Attach FLD26                       | <input checked="" type="checkbox"/> Excavations/Trenching – Attach FLD28 |
| <input type="checkbox"/> Fire Prevention – Attach FLD31                       | <input type="checkbox"/> Demolition – Attach FLD33                    | <input type="checkbox"/> Underground/Overhead Utilities – Attach FLD34   |
| <input type="checkbox"/> Hand and Power Tools – Attach FLD38                  | <input type="checkbox"/> Illumination – Attach FLD39                  | <input type="checkbox"/> Storage Tanks – Attach FLD40                    |
| <input checked="" type="checkbox"/> Lead Exposure – Attach FLD46              | <input checked="" type="checkbox"/> Sample Storage – Attach FLD49     | <input type="checkbox"/> Cadmium Exposure – Attach FLD50                 |
| <input type="checkbox"/> Asbestos Exposure – Attach FLD52                     | <input type="checkbox"/> Hexavalent Chromium Exposure – Attach FLD 53 | <input type="checkbox"/> Benzene Exposure – Attach FLD 54                |
| <input type="checkbox"/> Drilling Safety – Attach FLD56                       | <input type="checkbox"/> Drum Handling – Attach FLD58                 | <input type="checkbox"/> Gasoline Contaminant Exposure – Attach FLD61    |
| <input checked="" type="checkbox"/> Noise – Attach CECHSP, Section 7          | <input checked="" type="checkbox"/> Walking/Working Surfaces          | <input type="checkbox"/> Oxygen Deficiency                               |
| <input type="checkbox"/> Unknowns in Tanks or Drums                           | <input type="checkbox"/> Nonionizing Radiation                        | <input type="checkbox"/> Ionizing Radiation Attach FLD63                 |

## Biological Hazards to Personnel:

- |   |   |
|---|---|
| <input type="checkbox"/> Infectious/Medical/Hospital Waste – Attach FLD 44 and 45 | <input type="checkbox"/> Non-domesticated Animals – Attach RST 2 FLD43      |
| <input type="checkbox"/> Insects – Attach RST 2 FLD 43                            | <input type="checkbox"/> Poisonous Plants/Vegetation – Attach RST 2 FLD 43D |
| <input type="checkbox"/> Raw Sewage   | <input type="checkbox"/> Bloodborne Pathogens – Attach FLD 44 and 45        |

### **Training Requirements:**

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> 40-Hour HAZWOPER Training with three days supervised experience | <input type="checkbox"/> 8-Hour Management or Supervisor Training in addition to basic training course |
| <input checked="" type="checkbox"/> 8-Hour Annual Refresher Health and Safety Training              | <input type="checkbox"/> Site Specific Health and Safety Training                                      |
| <input type="checkbox"/> DOT (CMV Training - ERV in Use)  | <input type="checkbox"/> Bio-Medical Collection and Response   |

### **Medical Surveillance Requirements:**

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> Baseline initial physical examination with physician certification | <input checked="" type="checkbox"/> Annual medical examination with physician certification |
| <input type="checkbox"/> Site-specific medical monitoring protocol (Radiation, Heavy Metals)           | <input type="checkbox"/> Asbestos worker medical protocol                                   |

### **Vehicle Use Assessment and Selection:**

Driving is one of the most hazardous and frequent activities for Weston Employees. As such, Weston Employees are required to adhere to established safe operating practices in order to maintain their eligibility to drive Weston owned, leased, or rented vehicles. Every person riding in a Weston vehicle, including passengers must maintain a commitment for a safe journey. This means being attentive while in the vehicle and helping the driver to notice hazards ahead of and around the vehicle and ensure that their presence does not distract the driver from safely operating the vehicle.

A high percentage of vehicle accidents occur when operating in reverse. Anytime a vehicle is operated in reverse, e.g., backing out of a parking area, if there are passengers, at least one of them are to assist the driver by acting as a guide person during the reverse movement or during other vehicle operation where it would be prudent to have a guide person(s) participate in the vehicle movement. When practical, the preferred parking method would be to back into the parking area.

At a minimum, each Weston Driver must:

- Possess a current, valid drivers' license
- Current Commercial Motor Vehicle (CMV) card when operating the Emergency Response Vehicle
- Obey posted speed limits and traffic laws
- Wear seat belts at all times while the vehicle is in operation
- Conduct a 360 degree inspection around the vehicle before attempting to drive the vehicle
- Report accidents / incidents immediately and complete a Notice of Incident (NOI)
- Keep vehicles on approved roadways (4WD does not guarantee mobility on unapproved surfaces)



All Region II RST 2 personnel are experienced and qualified to drive RST 2 fleet vehicles (Tahoe, Suburbans, Minivan/Cargo Van, and Emergency Response Vehicle). However, in the event that vehicle rental is required, each person must take the time to familiarize themselves with that particular vehicle. This familiarization includes adjustment of the dashboard knobs/controls, mirrors, steering wheel, seats, and a 360 degree external inspection of the vehicle.

1. The following vehicles are anticipated to be used on this project:

- |   |   |
|---|---|
| <input type="checkbox"/> Car  | <input type="checkbox"/> Pickup Truck   |
| <input type="checkbox"/> Intermediate/Standard SUV<br>(e.g. Chevy Trailblazer, Chevy Tahoe, Ford Explorer, Ford Escape) | <input checked="" type="checkbox"/> Full Size SUV (e.g. Chevy Suburban, Ford Expedition, GMC Yukon) |
| <input type="checkbox"/> Minivan/Cargo Van (e.g. Chevy Uplander, Chevy Express Van)                                     | <input type="checkbox"/> Box Truck (Size:_____)   |
| <input type="checkbox"/> Emergency Response Vehicle (ERV)   | <input type="checkbox"/> Other_____   |

2. Are there any on-site considerations that should be noted:

- |  |   |  |  |
|--|---|--|--|
| <input checked="" type="checkbox"/> Working/Driving Surfaces | <input type="checkbox"/> Debris                             | <input type="checkbox"/> Overhead Clearance              | <input type="checkbox"/> Obstructions        |
| <input type="checkbox"/> Tire Puncture Hazards               | <input type="checkbox"/> Vegetation                         | <input type="checkbox"/> Terrain                         | <input checked="" type="checkbox"/> Parking  |
| <input checked="" type="checkbox"/> Congestion               | <input checked="" type="checkbox"/> Site Entry/Exit Hazards | <input checked="" type="checkbox"/> Local Traffic Volume | <input checked="" type="checkbox"/> Security |
| <input checked="" type="checkbox"/> Heavy Equipment          | <input type="checkbox"/> Time/Length of Work Day            | <input type="checkbox"/> Other:                          |  |

Do any of the considerations above require further explanation: No

3. Was the WESTON Environmental Risk Management Tool completed in EHS? Yes

Was an Environmental Compliance Plan required? No

4. Are there any seasonal considerations that should be noted (e.g., Anticipated Snowy Conditions): Cold, snow and dampness.

5. Is a Traffic Control Plan required?

- ☐ Yes ☒ No

## Chemical Hazards to Personnel

Page 1 of 1

<b>Physical Parameters</b>	<b>Chemical Contaminant Lead CAS [7439-92-1]</b>
Exposure Limits IDLH Level	<p>_____ ppm <u>0.050</u> mg/m<sup>3</sup> PEL</p> <p>_____ ppm <u>0.050</u> mg/m<sup>3</sup> TLV / REL</p> <p>_____ ppm <u>100</u> mg/m<sup>3</sup> IDLH</p>
Physical Form (Solid/Liquid/Gas)	<input checked="" type="checkbox"/> Solid _____ Liquid _____ Gas
Color	A heavy, ductile, soft, gray solid color
Odor	Odorless
Flash Point Flammable Limits	<p><u>N/A</u> _____ Degrees F or C</p> <p><u>NA</u> _____ % UEL <u>NA</u> _____ % LEL</p>
Vapor Pressure	<u>0</u> mm/Hg
Vapor Density	<u>NA</u> Air = 1
Specific Gravity	<u>11.34</u> Water = 1
Solubility	Insoluble
Incompatible Material	Strong Oxidizers, hydrogen peroxide, acids
Routes of Exposure	<p><input checked="" type="checkbox"/> Inh _____ Abs</p> <p><input checked="" type="checkbox"/> Con <input checked="" type="checkbox"/> Ing</p>
Symptoms of Acute Exposure	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia; weight loss; malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; irritation eyes, hypertension
First Aid Treatment	<p><b>Eye:</b> Irrigate immediately</p> <p><b>Skin:</b> Soap wash immediately</p> <p><b>Breathing:</b> Respiratory support</p> <p><b>Swallow:</b> Medical attention immediately</p>
Ionization Potential	<u>N/A</u> _____ eV
Instruments for Detection	<p>_____ PID w/ _____ Probe</p> <p>_____ FID _____ CGI _____ RAD</p> <p>_____ Det Tube _____ Other</p> <p>_____ Lumex</p>

**Site Map with Work Zones:** The contamination reduction zone and the support zone will be determined on-site based on the Removal Action activities.



\*\*This map is subject to Google's Terms of Service, and Google is the owner of rights therein.

### **Work Zone Definitions:**

Exclusion Zone (Red Outline) – The Exclusion Zone is the area where contamination is either known or expected to occur and the greatest potential for exposure exists. The outer boundary of the Exclusion Zone, called the Hotline, separates the area of contamination from the rest of the Site.

Contamination Reduction Zone (CRZ) – The CRZ is the area in which decontamination procedures take place. The purpose of the CRZ is to reduce the possibility that the Support Zone will become contaminated or affected by the Site hazards.

Support Zone – The Support Zone is the uncontaminated area where workers are unlikely to be exposed to hazardous substances or dangerous conditions. The Support Zone is the appropriate location for the command post, medical station, equipment and supply center, field laboratory, and any other administrative or support functions that are necessary to keep site operations running efficiently.

**Communications:**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Buddy System  | <input type="checkbox"/> Radio                                  |
| <input type="checkbox"/> Air Horn for Emergencies | <input checked="" type="checkbox"/> Hand Signals/Visual Contact |

**Personnel Decontamination Procedures:**

- ☐ Wet Decontamination (procedures as follows)
- ☒ Dry Decontamination (procedures as follows)

Soil sampling activities conducted as part of the Removal Action will be conducted in Level D personal protective equipment (PPE). All used PPE will be grossly decontaminated and disposed of in accordance with applicable federal, state, and local regulations.

**Equipment Decontamination Procedures:**

- ☒ None
- ☐ Wet Decontamination (procedures as follows)
- ☐ Dry Decontamination (procedures as follows)

All dedicated disposable sampling equipment will be disposed of in trash bags and disposed in accordance with applicable federal, state, and local regulations.

Adequacy of decontamination determined by: Site Health & Safety Officer

**Personal Protective Equipment**

TASK TO BE PERFORMED	ANTICIPATED LEVEL OF PROTECTION	TYPE OF CHEMICAL PROTECTIVE COVERALL	INNER GLOVE/ OUTER GLOVE/ BOOT COVER	APR CARTRIDGE TYPE OR SCBA
Perimeter Air Monitoring	Level D	None	Nitrile gloves/Latex Booties/Steel Toe Boots/Safety Glasses	None
Post Excavation Soil Sampling	Level D	None	Nitrile gloves/Latex Booties/Steel Toe Boots/Safety Glasses	None
Site Documentation	Level D	None	Nitrile gloves/Latex Booties/Steel Toe Boots/Safety Glasses	None

## Hazard Task Analysis

<b>RISK LEVEL (High, Medium, Low)</b>	<b>HAZARD</b>	<b>RECOGNITION/ SYMPTOMS</b>	<b>MITIGATION</b>	<b>LEVEL OF PROTECTION</b>
Low	Slips, trips, falls around uneven surfaces	Unsure or unstable footing and walking, safely navigate walking/working surfaces.	<ul style="list-style-type: none"> <li>• Visually inspect work areas and mark, barricade, or eliminate slip, trip, and fall hazards.</li> <li>• Avoid walking uneven surfaces, if possible.</li> </ul>	Level D
Low	Exposure to contaminants	Contact with contaminated soil and dirty or leaking sample containers.	<ul style="list-style-type: none"> <li>• Wear required PPE, including nitrile gloves, as specified in this HASP.</li> <li>• Follow all equipment decontamination procedures for reusable equipment.</li> <li>• Handle all glassware with care. Bottles may break if dropped; use leather gloves when cleaning up broken glass.</li> <li>• Ensure that each container top is securely tightened. Pack each container in a manner to prevent damage to container during handling of shipping box and during transportation.</li> </ul>	Level D
High	Working Around Heavy Equipment	Activities conducted near heavy equipment have the potential for injury	Use of hard hats and steel toe boots, awareness of surroundings, maintaining eye contact with equipment operator.	Level D

Frequency and Types of Air Monitoring: Not Applicable

☒ Continuous

☐ Routine - \_\_\_\_\_

☒ Periodic -

DIRECT READING INSTRUMENTS	<b>MultiRAE</b> CGI / O <sub>2</sub> / H <sub>2</sub> S / CL <sub>2</sub> / CO / PID	<b>MicroFID</b> or <b>TVA-1000</b>	<b>Drager</b> Chemical Detector Tube	<b>DustTrak</b>	<b>XRF</b>
EQUIPMENT ID NUMBER	NA	NA	NA	TBD	NA
CALIBRATION DATE	--	--	--	--	--
RST 2 PERSONNEL	--	--	--	Aleksandra Mallon	--
ACTION LEVEL	<p>≥ 10 - 20% LEL (Confined Space / non-Confined Space)</p> <p>≤ 19.5%, O<sub>2</sub> Deficient ≥ 23%, O<sub>2</sub> Enriched</p> <p>H<sub>2</sub>S – PEL: 20 ppm IDLH: 100 ppm</p> <p>Cl<sub>2</sub> – PEL: 1 ppm IDLH: 10 ppm</p>	<p>Unknowns: 1 - 5 Units - "Level C" 5-500 Units-"Level B"</p>	<p>PEL / TLV / IDLH: Compare with Drager Tube</p> <p>(See Chart Below)</p>	<p>Particulates ≥75 µg/m<sup>3</sup></p>	NA

### Emergency Telephone Numbers

Emergency Contact	Location / Address	Telephone Number	Notified
<b>Hospital</b>	University of Medicine and Dentistry of New Jersey (UMDNJ) University Hospital 150 Bergen Street, Newark, NJ 07103	Emergency: 911 Non-emergency: (973) 972-4300	No
<b>Police</b>	Newark Police Department 311 Washington Street, Newark, NJ 07103	Emergency: 911 Non-emergency: (973) 733-6000	No
<b>Fire Department</b>	Newark Fire Department 311 Washington Street, Newark, NJ 07102	Emergency: 911 Non-emergency: (973) 733-7400	No

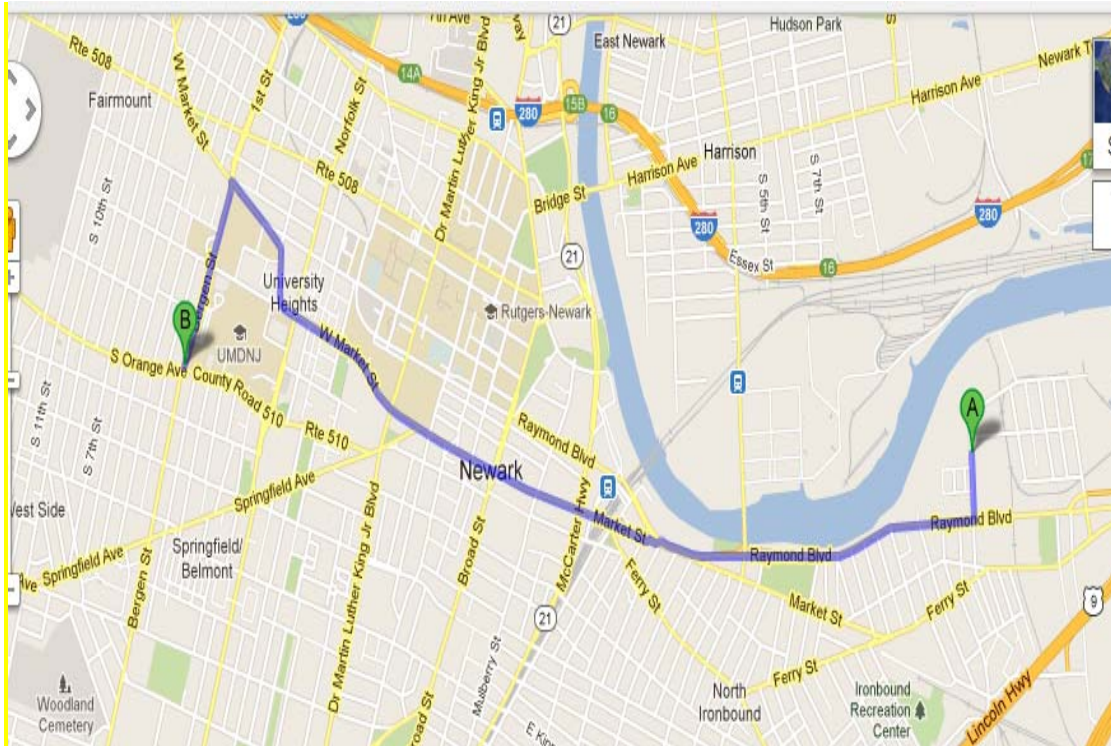
Chemical Trauma Capability? ☒ Yes ☐ No

If no, closest backup: \_\_\_\_\_ Phone: \_\_\_\_\_

Directions to UMDNJ University Hospital (Color Map Following This Page):

1. Head south on Chapel St. toward Riverview Ct. 0.2 mi
2. Take the 3<sup>rd</sup> right onto Raymond Blvd. 1.0 mi
3. Slight right to stay on Raymond Blvd. 0.2 mi
4. Slight left onto Market St. 0.9 mi
5. Market Street becomes County Route 510/Springfield Ave. 0.2 mi
6. Slight right onto CR 510/S. Orange Ave. 0.7 mi
7. Slight right onto Bergen St.  
Destination will be on the right

Destination is 3.1 mile = 9 minutes.



\*\*This map is subject to Google's Terms of Service, and Google is the owner of rights therein.

Route verified by: Aleksandra Mallon

Date: 11/8/2013



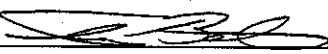
### Additional Emergency Telephone Contacts

<b>WESTON Medical Emergency Service</b> Dr. Peter Greaney, Medical Director WorkCare 300 South Harbor Blvd, Suite 600 Anaheim, California 92805	800-455-6155 Regular Business Hours (9AM to 7:30PM) <b>Dial 0 or Ext. 175 for Michelle Bui to request the on-call clinician.</b> 800-455-6155 After Hours (Weekdays 7:31PM to 8:59AM, Weekends, Holidays) <b>Dial 3 to reach the after-hours answering service. Request that the service connect you with the on-call clinician or the on-call clinician will return your call within 30 minutes.</b>
Chemtrec	800-424-9300
ATSDR	404-639-0615
ATF (explosives information)	800-424-9555
National Response Center	800-424-8802
National Poison Control Center	800-764-7661
<b>Chemtel</b>	800-255-3924
DOT	800-424-8802
CDC	800-232-0124

#### Pre-Response Approval

HASP prepared by: Aleksandra Mallon

Date: 11/26/2013

Pre-Response/Entry Approval by: 

Date: 11/26/13

<b>Tasks Conducted</b>	<b>Level of Protection/Specific PPE Used</b>
Perimeter Air Monitoring	Level D/Nitrile gloves/Latex Booties/Steel Toe Boots/Safety Glasses
Post Excavation Soil Sampling	Level D/Nitrile gloves/Latex Booties/Steel Toe Boots/Safety Glasses
Site Documentation	Level D/Nitrile gloves/Latex Booties/Steel Toe Boots/Safety Glasses

### **Hazardous Waste Site and Environmental Sampling Activities**

Off Site:    ☐    Yes    ☒    No

On Site:    ☒    Yes    ☐    No

Describe types of samples and methods used to obtain samples:

#### **Air monitoring**

Air monitoring for particulates will be conducted using DustTrak 8530 units. The air monitors will be calibrated before each sampling. A total of four DustTraks will be utilized, two air monitors will be placed downwind, one upwind, and one cross wind from the excavation area.

#### **Air sampling**

Air samples for lead analysis will be collected using a 37 millimeters (mm), 0.8 micrometers (µm) mixed cellulose ester (MCE) filter cassette in accordance with the EPA/Emergency Response Team (ERT) Standard Operating Procedure (SOP) #2119, Air Sampling for Metals National Institute for Occupation Safety and Health (NIOSH) Method 7300. Air will be drawn through the filter media using Gillian GilAir pumps. The pumps will be calibrated before and after each sampling event using a BIOS dry cell calibrator and a flow rate of 2.0 Liters per minute (L/min) for a period of 8 hours will be used for each lead sample. The air samples will be collected at various locations along the site perimeter.

#### **Soil Sampling**

Post excavation soil samples will be collected and submitted for TAL metal analysis. Sample locations will be determined by the EPA On-Scene Coordinator (OSC). All samples will be collected in accordance with EPA/ERT SOP #2012.

Was laboratory notified of potential hazard level of samples?    ☒    Yes    ☐    No

Note: The nature of the work assignment may require the use of the following procedures/programs which will be included as attachments to this HASP as applicable: Emergency Response Plan, Spill Containment Program.

Disclaimer: This HASP was prepared for work to be conducted under the RST 2 Contract EP-W-06-072. Use of this HASP by WESTON and its subcontractors is intended to fulfill the OSHA requirements found in 29 CFR 1910.120. Items not specifically covered in this HASP are included by reference to 29 CFR 1910 and 1926.

The signatures below indicate that the individuals have read and understood this Health and Safety Plan.

PRINTED NAME	SIGNATURE	AFFILIATION	DATE

**Post-Response Approval**

Final Submission of HASP by:		Date:
Post Response Approval by:		Date:
RST 2 HSO Review by:		Date:

## Air Monitoring Summary Log

Date: \_\_/\_\_/\_\_

Data Collected by: \_\_\_\_\_

Station/Location	CGI / O <sub>2</sub> Meter / CL <sub>2</sub> / H <sub>2</sub> S	PID	FID / TVA-1000	DustTrak	Other (_____)

**ATTACHMENT A:**  
**NIOSH POCKET GUIDES**



## Search the Pocket Guide

SEARCH

Enter search terms separated by spaces.

## Lead












**Synonyms & Trade Names** Lead metal, Plumbum**CAS No.** 7439-92-1**RTECS No.** OF7525000  
(/niosh-rtecs/OF72D288.html)**DOT ID & Guide****Formula** Pb**Conversion****IDLH** 100 mg/m<sup>3</sup> (as Pb)  
See: 7439921 (/niosh/idlh/7439921.html)

## Exposure Limits




**NIOSH REL** \*: TWA (8-hour) 0.050 mg/m<sup>3</sup> See Appendix C (nengapdxc.html) [\*Note: The REL also applies to other lead compounds (as Pb) -- see Appendix C.]


**OSHA PEL** \*: [1910.1025] TWA 0.050 mg/m<sup>3</sup> See Appendix C (nengapdxc.html) [\*Note: The PEL also applies to other lead compounds (as Pb) -- see Appendix C.]

## Measurement Methods

**NIOSH** 7082  (/niosh/docs/2003-154/pdfs/7082.pdf), 7105  (/niosh/docs/2003-154/pdfs/7105.pdf), 7300  (/niosh/docs/2003-154/pdfs/7300.pdf), 7301  (/niosh/docs/2003-154/pdfs/7301.pdf), 7303  (/niosh/docs/2003-154/pdfs/7303.pdf), 7700  (/niosh/docs/2003-154/pdfs/7700.pdf), 7701  (/niosh/docs/2003-154/pdfs/7701.pdf), 7702  (/niosh/docs/2003-154/pdfs/7702.pdf), 9100  (/niosh/docs/2003-154/pdfs/9100.pdf), 9102  (/niosh/docs/2003-154/pdfs/9102.pdf), 9105  (/niosh/docs/2003-154/pdfs/9105.pdf);

**OSHA ID121**

(<http://www.osha.gov/dts/sltc/methods/inorganic/id121/id121.html>)   
 (<http://www.cdc.gov/Other/disclaimer.html>), **ID125G**  
 (<http://www.osha.gov/dts/sltc/methods/inorganic/id125g/id125g.html>)  
 (<http://www.cdc.gov/Other/disclaimer.html>), **ID206**  
 (<http://www.osha.gov/dts/sltc/methods/inorganic/id206/id206.html>)  
 (<http://www.cdc.gov/Other/disclaimer.html>)

See: NMAM (/niosh/docs/2003-154/) or OSHA Methods  
 (<http://www.osha.gov/dts/sltc/methods/index.html>)   
 (<http://www.cdc.gov/Other/disclaimer.html>)

**Physical Description** A heavy, ductile, soft, gray solid.**MW:**  
207.2**BP:**  
3164°  
F**MLT:**  
621°F**Sol:**  
Insoluble**VP:** 0 mmHg (approx)**IP:** NA**Sp.Gr:**  
11.34**Fl.P:**  
NA**UEL:**  
NA**LEL:** NA

Noncombustible Solid in bulk form.

**Incompatibilities & Reactivities** Strong oxidizers, hydrogen peroxide, acids**Exposure Routes** inhalation, ingestion, skin and/or eye contact

**Symptoms** lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension

**Target Organs** Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue

**Personal Protection/Sanitation** (See [protection codes \(protect.html\)](#))

**Skin:** Prevent skin contact

**Eyes:** Prevent eye contact

**Wash skin:** Daily

**Remove:** When wet or contaminated

**Change:** Daily

**First Aid** (See [procedures \(firstaid.html\)](#))

**Eye:** Irrigate immediately

**Skin:** Soap flush promptly

**Breathing:** Respiratory support

**Swallow:** Medical attention immediately

#### **Respirator Recommendations**

(See [Appendix E](#)) ([nengapdx.html](#))

#### **NIOSH/OSHA**

##### **Up to 0.5 mg/m<sup>3</sup>:**

(APF = 10) Any air-purifying respirator with an N100, R100, or P100 filter (including N100, R100, and P100 filtering facepieces) except quarter-mask respirators.

[Click here \(pgintrod.html#nrp\)](#) for information on selection of N, R, or P filters.

(APF = 10) Any supplied-air respirator

##### **Up to 1.25 mg/m<sup>3</sup>:**

(APF = 25) Any supplied-air respirator operated in a continuous-flow mode

(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.

##### **Up to 2.5 mg/m<sup>3</sup>:**

(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.

[Click here \(pgintrod.html#nrp\)](#) for information on selection of N, R, or P filters.

(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode

(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter

(APF = 50) Any self-contained breathing apparatus with a full facepiece

(APF = 50) Any supplied-air respirator with a full facepiece

##### **Up to 50 mg/m<sup>3</sup>:**

(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

##### **Up to 100 mg/m<sup>3</sup>:**

(APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

##### **Emergency or planned entry into unknown concentrations or IDLH conditions:**

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

##### **Escape:**

(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.

[Click here \(pgintrod.html#nrp\)](#) for information on selection of N, R, or P filters.

Any appropriate escape-type, self-contained breathing apparatus

[Important additional information about respirator selection \(pgintrod.html#mustread\)](#)

See also: [INTRODUCTION \(/niosh/npg/pgintrod.html\)](#) See ICSC CARD: [0052 \(/niosh/ipcsneng/neng0052.html\)](#) See MEDICAL TESTS: [0127 \(/niosh/docs/2005-110/nmed0127.html\)](#)

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Page last reviewed: April 4, 2011

Page last updated: November 18, 2010

Content source: [National Institute for Occupational Safety and Health \(NIOSH\)](#) Education and Information Division

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Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA  
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348 - [Contact CDC-INFO](#)





ATTACHMENT B:

WESTON FLDS

	Weston Solutions, Inc.		Doc No:	FLD01-0411
			Initial Issue Date	April 2011
			Revision Date:	Initial Version
FLD01 Occupational Noise and Hearing Conservation Program			Revision No.	0
			Next Revision Date:	Annual Review
Preparation: CEHS	Authority: CEHS Director	Issuing Dept: CEHS	Page:	Page 1 of 5

## 7.0 OCCUPATIONAL NOISE AND HEARING CONSERVATION PROGRAM

Noise can cause sudden traumatic temporary or permanent hearing loss, long-term slowly occurring sensory-neural and irreversible hearing loss, disruption of communication, and masking of warning devices and alarms. Additional concerns include increased stress levels and effects on the cardiovascular and nervous systems. This Program describes the process for controlling, reducing, and minimizing noise exposure.

WESTON's OMP will assist in compliance with this Program through evaluation of clinics, verification of baseline exams, and employee audiogram evaluation. The OMP will advise the appropriate Safety Officer and, if necessary, the CEH&S Director of any problems associated with medical compliance or occupationally related hearing loss in workers.

The need for noise-monitoring equipment, noise dosimeters or hearing protection devices must be addressed in the planning stages of a project. Some of the sources of noise at hazardous materials sites, demolition operations, construction and industrial sites which can cause hearing damage are: earth moving equipment (front end loader, bull dozer), material handling equipment (cranes, industrial trucks), power units (compressors, generators drill rig engines), impact devices (pile drivers, chipping hammers), and other powered devices (saws, needle guns, drills, vibrating equipment).


### 7.1 NOISE EVALUATION AND SURVEILLANCE PROCEDURES

OSHA in 29 CFR 1910.95, establishes a PEL, time weighted average (TWA) of 90 dBA for an 8-hour work day and a TWA of 85 dBA as the trigger point (action level or AL) for establishing a Hearing Conservation Program (HCP). The HCP includes baseline and annual hearing tests, and hearing conservation training.

Noise exposure can also be compared to the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV). The TLVs for noise are arranged in a scale in dBs related to time periods. For an 8-hour work period the TWA TLV is 85 dBA, and the AL is 80 dBA. The ACGIH numbers are more conservative and realistically reflect current scientific knowledge on the human effects from noise exposure. Therefore, WESTON will use the ACGIH TLVs and Guidance and the 3 dB exchange rate as the basis for WESTON's HCP to provide a higher level of protection for our employees than that offered by compliance with the OSHA requirements which are several dB higher.

Noise exposure assessment is performed only by qualified personnel with properly calibrated and functional noise measuring equipment. If the HASP or the FSO indicates that the site, or activity, requires an instrumentation survey then the area will be screened with an A-weighted sound level meter (Area Monitoring). If deemed necessary a more in depth evaluation utilizing a noise dosimeter may be performed (Personnel Monitoring). Both types of monitoring, if needed, will be accomplished in accordance with requirements established in 29 CFR 1910.95(d).

In the absence of sound level measuring instrumentation, any noise preventing normal vocal discussion between two individuals at arm's length distance ("arms-length rule") will dictate the need for hearing protection. WESTON guidelines require the use of hearing protection on an immediate basis under the "arms-length rule". Exceptions may be granted based upon evaluation of a specific task and duration with consultation with an industrial hygienist.

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Long-term work efforts at fixed locations (e.g., water treatment plants, incinerators) require an evaluation of noise levels. Re-monitoring may be necessary when changes in equipment, processes, or activities result in modification of the noise level.

If impact noise is present, the peak noise levels and the frequency of the impacts should be determined. OSHA and ACGIH recommendations and/or qualified personnel should be consulted if questions arise regarding impact or impulse noise.

## 7.2 NOISE CONTROL METHODS

### Engineering Controls

The primary means of reducing or eliminating personnel exposure to noise is through engineering controls. Engineering controls are defined as any modification or replacement of equipment, or related physical change at the noise source or along the sound transmission path that will reduce the noise level to the employee's ear. Engineering controls include items such as; mufflers on heavy equipment or motors, sound baffles, and enclosures.

### Administrative Controls


Administrative controls may include changes in the work schedule or operations to reduce noise exposure, increasing worker distance from the noise source, and rotation of jobs to reduce time limits of exposure. Administrative time control is not a preferable method for preventing noise exposure since extreme noise for a short duration can cause severe, permanent hearing loss. Administrative controls may be utilized in accordance with the TLV Table ACGIH TLVs and Biological Exposure Indices (BEIs), 2007 Edition. Administrative controls may not be utilized for exposures greater than 100 dBA, regardless of the exposure time.

### Hearing Protection

Hearing protection devices are utilized whenever engineering controls prove to be infeasible or cost prohibitive. Various types of ear muffs and ear plugs are available. Hearing protector attenuation is intended to reduce employee exposures below 80 dBA for employees with standard threshold shifts and below 85 dBA for all other employees.

WESTON personnel and WESTON subcontractors must wear hearing protection devices (HPDs) when required and where signs are posted requiring their use. Hearing protection devices are strongly recommended in any noisy environment, but are mandatory in the following situations:

- The 8-hour average may equal or exceed 85 dBs.
- Any employee exposed to greater than or equal to 85 dBs and who have experienced a standard threshold shift in their hearing.
- Any noise equal to greater than 100 dBs impact, continuous or intermittent.
- Anywhere a "HEARING PROTECTION REQUIRED" sign is posted. These signs are to be posted in all mandatory situations listed above.

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In addition when noise levels equal or exceed 80 dBA employees must have:

- Availability of hearing protectors.
- Information and training on effects of noise.
- Availability of audiometric testing where there is a risk to health.

Not all hearing protection devices have the same noise reduction rating (NRR). Verification of all NRR values must be made by referring to the manufacturers' specifications. The proper hearing protection is selected using results from a properly calibrated sound level meter in accordance with ACGIH TLVs and BEIs, 2007 Edition.

Additional information regarding the selection, use, maintenance, and control of hearing protection devices is provided in the WESTON Personal Protective Equipment Program (Section 5.0).

NRR will be adjusted using the following to estimate the attenuation afforded to a noise-exposed employee in a work environment by muffs, plugs, or a combination of both:

### **Single Protection**

A common formula used to estimate exposure for **single protection** (either muffs or plugs) follows:

1. Determine the laboratory-based noise attenuation provided by the HPD. This is referred to as the NRR and is listed on the packaging.
2. Subtract the NRR from the C-weighted TWA workplace noise level, as follows:

$$\text{Estimated Exposure (dBA)} = \text{TWA (dBC)} - \text{NRR}$$

If C-weighted noise level data are not available, A-weighted data can be used by subtracting a 7 dB correction factor from the NRR, as follows:

$$\text{Estimated Exposure (dBA)} = \text{TWA (dBA)} - (\text{NRR} - 7)$$

*Example:*


TWA=100 dBA, muff NRR=19 dB

Estimated Exposure =  $100 - (19 - 7) = 88$  dBA

### **Dual Protection**

A common formula used to estimate exposure for **dual protection** (ear muffs and plugs are used simultaneously) follows:

1. Determine the laboratory-based NRR for the **higher** rated protector ( $\text{NRR}_h$ ).
2. Subtract 7 dB from  $\text{NRR}_h$  if using A-weighted sound level data.
3. Add 5 dB to the field-adjusted NRR to account for the use of the second hearing protector.

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4. Subtract the remainder from the TWA as follows:

**Estimated Exposure (dBA) = TWA (dBC) - (NRR<sub>h</sub> + 5) or**

**Estimated Exposure (dBA) = TWA (dBA) - [(NRR<sub>h</sub> - 7) + 5]**

*Example:*

TWA=110 dBA, plug NRR=29, and muff NRR=25 dB

Estimated Exposure = 110 - [(29 - 7) + 5] = 83 dBA

### 7.3 MEDICAL SURVEILLANCE

Compliance with the HCP is required when an employee's exposure to noise is in excess of 85 dBA. Employees who work with drill rigs, heavy construction equipment, or noisy client operations are candidates for the HCP and medical surveillance requirements thereof. Supervisors of any employees who do not meet these categories but who work around excessive noise (e.g., treatment plant operations, print shop, maintenance personnel) must perform noise surveys to determine the need for those employees to participate in the HCP, and advise the safety officer who will notify the OMP.

WESTON's OMP will make the final determination of employee involvement in the medical surveillance component of the HCP. Audiometric testing is performed annually to evaluate the hearing of all individuals who are routinely exposed to 8-hour TWA exposures of 85 dBA or greater (including compliance with the "arms-length rule"). WESTON's OMP is responsible for assuring local clinic compliance with the audiometric testing component of the standard.


### 7.4 TRAINING

Training is regularly provided during WESTON's initial and refresher courses under 29 CFR 1910.120 (HAZWOPER). Alternative training will be given to employees who are included in the HCP but are not required to have HAZWOPER training. Initial and annual training shall be given to each employee included in the HCP and address the following:

- The effects of noise on hearing.
- The purpose of hearing protection, advantages, disadvantages, attenuation of various types, and the selection, fitting, use, and care of protectors.
- The purpose of audiometric tests and explanation of test procedures.
- Recognition of hazardous noise.

### 7.5 PROGRAM EVALUATION

Periodic program evaluations will be conducted to assess compliance with 29 CFR 1910.95. WESTON's OMP is responsible for assisting in this evaluation by providing information relative to employee exposure and medical surveillance data.

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## 7.6 RECORDKEEPING

Employee exposure measurements are retained for a minimum of two years and audiometric test records are retained for the duration of the employee's employment, plus 30 years.

## 7.7 REFERENCES

29 CFR 1910.95, Occupational Noise Exposure

American Conference of Governmental Industrial Hygienists (ACGIH), Threshold Limit Value (TLV) for Chemical Substances and Physical Agents, 2007

## FLD 02 INCLEMENT WEATHER

Hot weather (ambient temperatures over 70°F), cold weather (ambient temperatures below 40°F), rain, snow, ice, and lightning are examples of inclement weather that may be hazardous or add risk to work activities. Extremes of heat, cold, and humidity, as well as rain, snow, and ice, can adversely affect monitoring instrument response and reliability, respiratory protection performance, and chemical protective clothing materials.

### RELATED FLDs AND OP

*FLD 05 – Heat Stress Prevention and Monitoring*

*FLD 06 – Cold Stress*

*OP 05-03-008 – Inclement Weather & Business Disruption Policy*

### PROCEDURE

The potential for exacerbating the impact of physical hazards must be considered for tasks that expose personnel to inclement weather. Risk assessment and hazards analysis should be accomplished during the planning stages of a project for the most likely inclement weather conditions that may be encountered, i.e., rain and lightning in late spring, summer, and early fall, or lightning prone areas; cold, snow, and ice in winter. The Field Safety Officer (FSO) must determine the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his/her work and be actively alert to these hazards. Managers and workers must be familiar with the requirements of FLD 05 and FLD 06.

A pre-site activity risk assessment must be completed when inclement weather occurs. Weather conditions that affect instruments and personal protective equipment (PPE) function must be conveyed to site workers who should monitor function and integrity of PPE and be alert to changing weather conditions. A decision must be made on the proper safety procedures to use if work must continue, or to stop work if the risk is too great. The appropriate Safety Professional **must be notified of all instances of the need to stop work for safety reasons, including inclement weather.**

### Heat

Hot, dry weather increases risk of soil drying, erosion, and dust dispersion, which may present or increase risk of exposure and environmental impact from toxic hazards. Hot weather will increase pressure on closed containers and the rate of volatilization, thereby potentially increasing the risk of exposure to toxic, flammable, or explosive atmospheres.

### Prevention and Protective Measures

Employees must be protected from airborne contaminants using engineering controls such as wetting dry soil to prevent particle dispersion, and providing local ventilation to reduce volatile air contaminants to safe levels, or if engineering controls are infeasible, using prescribed PPE. Wind shifts and velocity should be measured where change may result in dispersion of airborne contaminants into the work area.

### Rain, Wet Weather, and High Humidity

Wet conditions resulting from rain and wet weather increase slipping and tripping hazards, braking distances of vehicles, the potential for vehicle skidding, or difficulties in handling powered devices such as augers and drills. Rain fills holes, obscures trip and fall hazards, and increases risk of electrical shock

when working with electrical equipment. Changes in soil conditions caused by rain can impact trenching and excavating activities, creating the potential for quicksand formation, wall collapse, and cave-in. Vehicles become stuck in mud, and tools and personnel can slip on wet surfaces. Rain and wet conditions may decrease visibility (especially for personnel wearing respiratory protection) and limit the effectiveness of certain direct-reading instruments (e.g., photoionization detectors [PIDs]).

Feet that become wet and are allowed to remain wet can lead to serious problems under both heat and cold conditions. Activities that may result in wet feet include extended work in chemical protective clothing and wading in water/liquid during biological assessments. Trench foot, paddy foot, and immersion foot are terms associated with foot ailments resulting from feet being wet for long periods of time. All have similar symptoms and effects. Initial symptoms include edema (swelling), tingling, itching, and severe pain. These may be followed by more severe symptoms including blistering, death of skin tissue, and ulceration. (NOTE: The following Preventive and Protective Measures also apply to Cold, Snow, and Ice.)

### Preventive and Protective Measures

Walkways, stairs, ladders, elevated workplaces, and scaffold platforms must be kept free of mud, ice, and snow. Employees shall be prohibited from working on scaffolds covered with snow, ice, or other slippery material except as necessary for removal of such materials.

Vehicles used in rain or cold weather must have working windshield wipers and defrosters, and windows must be kept clear of obstruction.

Drivers must observe traffic laws, including maintaining speed within limits safe for weather conditions, and wearing seat belts at all times. Note that this may mean operating below the posted speed limit.

When walking, workers should use a walking stick or probe to test footing ahead where there is standing water, snow, or ice to protect the walker against stepping into potholes or onto puncture hazards, buried containers, or other potential structurally unsound surfaces.

Prior to using vehicles or equipment in off-road work, workers should walk the work area or intended travelway when puddles or snow may obscure potholes, puncture hazards, or buried containers, or other potential structurally unsound surfaces.

Project managers should arrange to have winches, come-alongs, or other mechanical assistance available when vehicles are used in areas where there is increased risk of getting stuck. Cable or rope and mechanical equipment used for pulling stuck vehicles must be designed for the purpose, of sufficient capacity for the load, and be inspected regularly and before use to ensure safety. **Manually pushing stuck vehicles is to be avoided.**

Prevention methods are required when work is performed in wet conditions or when conditions result in sweating, causing the feet to become and remain wet. Proper hygiene is critical. Workers must dry their feet and change socks regularly to avoid conditions associated with wet feet. Use of foot talc or powder can additionally assist in prevention of this type of condition.

### **Cold, Snow, and Ice**

Cold weather affects vehicle operation by increasing difficulty in starting and braking. Ice, frost, and snow can accumulate on windows and reduce vision. Cold, wet weather can cause icing of roadways,



driveways, parking areas, general work places, ladders, stairs, and platforms. Ice is not always as obvious to see as snow or rain, and requires special attention, especially when driving or walking.

Snow and ice increase the risk of accidents such as slipping when walking, climbing steps and ladders, or working at elevation, and the risk of accidents when driving vehicles or operating heavy equipment. Heavy snow and ice storms may cause electric lines to sag or break, and the use of electrical equipment in snow increases the risk of electric shock. Snow can hide potholes and mud, which can result in vehicles getting stuck or persons falling when stepping into hidden holes. Snow also may cover water, drums or other containers, sharp metal objects, debris, or other objects that can cause falls or punctures.

### Preventive and Protective Measures

WESTON personnel are cautioned against operating motor vehicles such as cars or trucks on ice under any circumstances. If traveling in icy conditions, WESTON personnel should follow all public service advisories that curtail driving activities.

Personnel performing activities that require working over ice should be aware of minimal ice thickness safety guidelines as follows:

- 4-inch minimum: activities such as walking or skating.
- 6-inch minimum: activities such as snowmobiling or the use of equipment with the same weight and cross-sectional area as a snowmobile.

Personnel should always be aware that these measurement guidelines are under ideal conditions and that snow cover, conditions on rivers, ponds, or lakes with active currents, and other environmental factors impact the safety of working on ice. Clear ice typically is the strongest, while ice that appears cloudy or honeycombed (contains entrained air) is not as structurally strong. Measurements made by drilling or cutting through the ice should be made every few feet to verify safe conditions. Provisions for rescue (e.g., ladders or long poles and effective communications) must be available at the work site.

## **Lightning**

Lightning represents a hazard of electrical shock that is increased when working in flat open spaces, elevated work places, or near tall structures or equipment such as stacks, radio towers, and drill rigs. Lightning has caused chemical storage tank fires and grass or forest fires. Static charges associated with nearby electrical storms can increase risk of fire or explosion when working around flammable materials, and can adversely affect monitoring instruments.

Lightning is the most dangerous and frequently encountered weather hazard people experience each year. Lightning affects all regions. **Florida, Michigan, Pennsylvania, North Carolina, New York, Ohio, Texas, Tennessee, Georgia, and Colorado** have the most lightning deaths and injuries.

### Preventive and Protective Measures

Prior to working in areas or beginning projects when or where there is an increased potential for lightning striking personnel, steps must be taken to predict the occurrence of lightning strikes. Recommendations include:

- Check with client management to determine if there are any patterns or noted conditions that can help predict lightning or if there are structures that are prone to lightning strikes. Arrange for

client notification when there is increased potential for lightning activities. Ensure that clients include WESTON workers in lightning contingency plans.

- Monitor weather reports.
- Note weather changes and conditions that produce lightning.
- Stop work in open areas, around drill rigs or other structures that may attract lightning, on or in water and in elevated work places when lightning strikes are sighted or thunder is heard near a work site.
- Ensure all personnel are provided with safe areas of refuge. Prevent personnel from standing in open areas, under lone trees, or under drill rigs.
- Observe the “30-30” Rule. If you see lightning and thunder is heard within 30 seconds (approximately 6 miles), seek shelter. If you hear thunder, but did not see the lightning, you can assume that lightning is within 6 miles and you should seek shelter. Remain in the sheltered location for 30 minutes following the last lightning strike.
- Use a hand held static potential meter (lightning detection device) to monitor the potential difference between a cloud and the ground. When the measured potential is greater than 2 kV/m, there is a potential for a lightning strike – seek shelter.

## **High Wind and Tornado Safety**

### High Winds

Many construction workers have died due to wind-related accidents and injuries. A ladder that seems secure under normal circumstances can become unstable during windy conditions and cause you to fall. Scaffolding that is improperly secured can rip free during strong winds and kill bystanders. The risk of injury for construction workers increases during strong winds. Keep in mind that changing weather conditions can affect your daily work tasks, and make sure you have a game plan to prevent proper damage and personal injury.

Stay Informed: With today’s modern technology available at the touch of a button, you should keep up to date with the latest local weather reports. Visit [weatherbug.com](http://weatherbug.com) or [weather.gov](http://weather.gov) to stay informed in case of wind warnings, watches, and advisories. Larger projects may have their own weather station on site to provide instant weather data. Use daily hazard assessments to determine if working conditions have changed or will change throughout the day.

Be Prepared: When you know the weather will be windy, secure loose building materials, scaffolding and fencing that could be picked up or torn loose by strong winds and thrown onto surrounding streets, structures, vehicles, or bystanders.

Know the Limits of Your Equipment: When operating any equipment, take time to read the operator’s manual and become familiar with the wind specifications. Many crane manufacturers have high-wind guidelines to prevent you from operating a crane in unsafe weather. You should also check safety equipment such as fall protection to determine if it is adequate for windy conditions.

## Know the Terminology

### Severe Thunderstorm Watch

A Severe Thunderstorm Watch means that strong thunderstorms capable of producing winds of 58 mph or higher and/or hail 3/4 inches in diameter or larger are possible. If you are in the area of a Severe Thunderstorm Watch, you should be prepared to take shelter from thunderstorms. Severe Thunderstorm Watches are generally issued for 6-hour periods.

### Severe Thunderstorm Warning

A Severe Thunderstorm Warning means that thunderstorms capable of strong winds and/or large hail are occurring or could form at any time. If you are in the area of a severe thunderstorm, you should take shelter indoors immediately, avoid windows, and be prepared for high winds and hail. Severe Thunderstorm Warnings are generally in effect for an hour or less.

### High Wind Watch

A High Wind Watch is issued when sustained winds exceeding 40 mph and/or frequent gusts over 60 mph are likely to develop in the next 24 to 48 hours. For summit areas, high wind watches are issued when sustained winds are expected to exceed 45 mph and/or frequently gust over 60 mph. If you are in an area for which a High Wind Watch has been issued you should secure loose objects outdoors that may blow about and avoid outdoor activity that exposes you to high winds.

### High Wind Warning

A High Wind Warning is issued when sustained winds exceeding 40 mph and/or frequent gusts over 60 mph are occurring or imminent. For summit areas, warnings are issued for winds exceeding 45 mph and/or frequently gusting over 60 mph. Wind warnings may issued up to 24 hours ahead of the onset of high winds and remain in effect for 6 to 12 hours. If you are in an area where a high wind warning is in effect you should avoid activities that expose you to high winds. Loose objects may be blown around. Tree limbs may break and fall. Power lines may be blown down.

### Wind Advisory

A Wind Advisory is issued when sustained winds of 30 to 39 mph and/or frequent gusts to 50 mph or greater are occurring or imminent. Wind advisories may be in effect for 6 to 12 hours. If you are in an area where a wind advisory is in effect you should secure loose objects that may be blown about outdoors and limit activity that may expose you to high winds.

Work Safely: If you will be working on a windy day, you should be alert and protected. Wear eye protection to prevent dust and other particles from entering or striking your eyes. Keep your hard hat on at all times to prevent injuries from falling or flying objects. The likelihood of falls from heights is greatly increased by strong winds. Wear the necessary PPE to ensure your safety.

To avoid flying debris and to minimize damage during high winds:

- Shut down outdoor activities involving work at elevation on ladders, scaffolding, aerial lifts, etc.; handling large tarps and plastic sheeting when wind speeds exceed 25 mph; including work with radioactive materials and highly toxic materials that could be dispersed by the winds.
- At 13 - 18 mph wind will raise dust. Follow the dust action level.

- Move mobile items stored outside to indoor storage.
- Secure any items that cannot be moved inside.
- Be careful opening exterior doors.
- Be cautious about downed power lines, tree limbs, and debris on roads.
- Be alert for animals who have escaped from farms and zoos.

Stay Away from Power Lines: High winds can cause tree limbs to fall on power lines resulting in electrocution hazards or loss of power. Your best bet is to keep your distance.

## Tornados

### What is a TORNADO?

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm or as a result of severe weather associated with hurricanes. A funnel cloud is formed as cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado results from high wind velocity and wind blown debris.

### Tornado Safety

When a tornado approaches, you have only a brief amount of time to make life-or-death decisions. Advance planning and quick response are the keys to surviving a tornado.

Purchase a NOAA Weather Alert radio with an alert feature. When tuned to the proper frequency, these weather radios remain silent until a weather emergency occurs. Once they pick up the alarm tone, they will begin broadcasting emergency weather information so that citizens can protect themselves and their property. Some models of the NOAA weather radio incorporate the Specific Area Message Encoder technology, allowing users to target only those warnings that affect their immediate geographic area.

Conduct tornado drills. Designate an area to serve as your safe area, and practice having team members assemble there in response to a mock tornado warning.

Emergency Communications Plan. Develop an emergency communications plan in case team members are separated from one another when a tornado warning goes into effect. Designate an emergency coordinator. Instruct everyone to contact this coordinator in a weather emergency for instructions on what to do during the storm and where to reassemble after the emergency has passed. Design contingency plans to be consistent with client contingency plans. When possible use client warning and alerting systems and confirm that team members have access to shelters and know how to get to them.

### Know the Difference between a Tornado Watch and a Tornado Warning

Tornado Watch: Issued by the National Weather Service when tornadoes are possible in your area. You should remain alert for approaching storms. Remind family members of where the safe areas are within your home, and carefully monitor radio or television reports for further developments.

Tornado Warning: Indicates that a tornado has been sighted in your area, or is indicated on weather radar. You should proceed to safe shelter immediately.

*When A Tornado Warning Goes In Effect, Put Your Safety Plans In Action.*

In Your Automobile: Motor vehicles are easily overturned by tornado winds. Leave your vehicle and seek shelter in a sturdy building. As a last resort, seek shelter in a ditch or culvert. Do not try to outrun or outmaneuver a tornado! Use the time to seek appropriate shelter outside your vehicle.

Office Buildings, Hotels, and Shopping Centers: Take shelter in an interior hallway on a lower floor. A closet, bathroom or other small room with short, stout walls will give some protection from collapse and flying debris. Otherwise, get under heavy furniture and stay away from windows. Many tornado deaths have occurred in large buildings due to the collapse of a roof or wide span wall. A corner area, away from a window, is safer than the middle of a wide span wall.

Out In Open Country: When severe weather approaches, seek inside shelter immediately. The chances of encountering falling trees, downed power lines and lightning are far greater than encountering a tornado itself. If a tornado approaches, lie flat in the nearest depression, such as a culvert or ditch, and cover your head with your arms.

**BE ALERT TO CHANGING WEATHER CONDITIONS**

**HAVE AN EMERGENCY WEATHER PLAN IN PLACE**

**REHEARSE YOUR CONTINGENCY PLANS PERIODICALLY**

**KNOW WHERE TO GO WHEN A TORNADO THREATENS.**

## FLD 06 COLD STRESS

Three major factors that contribute to cold stress are cold temperatures, dampness, and wind velocity. Persons working outdoors in low temperatures, especially in wet or windy conditions, are subject to cold stress. Exposure to extreme cold for even a short time can cause severe injury to the surface of the body, or result in cooling of the body core temperature which, if unchecked, can be fatal. Site workers must learn to recognize and treat the various forms of cold stress.

### RELATED FLDs

*FLD 02 – Inclement Weather*

*FLD 17 – Diving*

*FLD 19 – Working Over or Near Water*

*FLD 25 – Working at Elevation/Fall Protection*

### GENERAL INFORMATION

Body heat is conserved through the constriction of surface blood vessels. This constriction reduces circulation at the skin layers and keeps blood nearer the body core. Loss of body heat can occur through:

1. Respiration – The process of breathing; inhaling and exhaling air. Heat is lost when breathing cold air into the lungs.
2. Evaporation – Heat loss from the body by vaporization of water from the skin surface.
3. Conduction – Direct transfer of body heat by contact with a cooler object. Conduction may occur when sitting on snow, touching cold equipment, and working in the rain. Body heat is lost rapidly when a person becomes wet. Most clothing loses approximately 90 percent of its insulating properties when wet. Additionally, water conducts heat 240 times faster than air; thus, the body cools suddenly when the layer of clothing that contacts the skin becomes wet.
4. Radiation – Heat radiated outward from the body to a cooler environment. The greatest amount of body heat is lost from uncovered surfaces of the body, especially the head, neck, and hands.
5. Convection – Heat transferred to cool air moving across the surface of the body. The body continually heats a thin layer of air next to the skin. Clothing retains this warm surface layer of air. If this warm air is removed by air currents (wind), the body will be cooled while attempting to rewarm the surface air. Wind chill is the chilling effect of moving air in combination with low temperature.

Other factors may contribute to cold stress, such as:

1. Medications, including antidepressants, sedatives, tranquilizers and some heart medications may affect the body's ability to thermo-regulate.
2. Dehydration, or the loss of body fluids, occurs in a cold environment and may increase the susceptibility of workers to cold injury due to a significant change in blood flow to the extremities.
3. Heavy work typically causes sweating that will result in wet clothing.

4. A worker's predisposing health condition such as cardiovascular disease, diabetes, and hypertension.
5. Older people are not able to generate heat as quickly, thus may be at more risk than younger adults.

When the body is unable to warm itself, serious cold-related illness and injuries may occur, including permanent tissue damage and possible death.

## **RECOGNITION AND RISK ASSESSMENT**

In the planning stages of a project, the potential for cold-related hazards must be considered in the site-specific Health and Safety Plan (HASP) and during risk assessment. The Field Safety Officer (FSO) must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

### **Low Temperature + Wind Speed + Wetness = Injuries and Illness**

The Cold Stress Equation (OSHA Card-3156) is a quick-reference tool provided on the Weston Portal.

## **Frostbite**

Frostbite is the freezing of tissue and most commonly affects the toes, ears, fingers, and face. Frostbite occurs when an extremity loses heat faster than it can be replaced by the circulating blood. Frostbite may result from direct exposure to extreme cold or cool, high wind. Damp socks and shoes may contribute to frostbite of the toes.

Signs and symptoms of frostbite include:

- Cold, tingling, aching, or stinging feeling followed by numbness
- Skin color is red, purple, white, or very pale and is cold to the touch
- Blisters may be present (in severe cases)

Treatment for frostbite:

- Call for emergency medical assistance.
- Move the victim indoors and/or away from additional exposure to cold, wet, and wind.
- Wrap the affected area in a soft, clean cloth (sterile, if available).
- Give a warm drink (water or juices, not coffee, tea or alcohol). Do not allow the victim to smoke.
- Do not rub the frostbitten part (this may cause gangrene).
- Do not use ice, snow, gasoline or anything cold on the frostbitten area.
- Do not use heat lamps or hot water bottles to rewarm the frostbitten area.
- Do not place the frostbitten area near a hot stove.
- Do not break blisters.
- After rewarming, elevate the area and protect it from further injury.

## **Hypothermia**

Hypothermia means "low heat" and is a potentially serious condition. Systemic hypothermia occurs when body heat loss exceeds body heat gain and the body core temperature falls below the normal 98.6°F. While some hypothermia cases are caused by extremely cold temperatures, most cases develop in air

temperatures between 30° and 50°F, especially when compounded with water immersion and/or windy conditions.

The victim of hypothermia may not know, or refuse to admit, that he or she is experiencing hypothermia. All personnel must be observant for these signs for themselves and for other team members. Hypothermia can include one or more of the following symptoms.

- Cool bluish skin
- Uncontrollable shivering
- Vague, slow, slurred speech
- Irritable, irrational, or confused behavior
- Memory lapses
- Clumsy movements, fumbling hands
- Fatigue or drowsiness

Below the critical body core temperature of 95°F, the body cannot produce enough heat by itself to recover. At this point, emergency measures must be taken to reverse the drop in core temperature. The victim may slip into unconsciousness and can die in less than 2 hours after the first signs of hypothermia are detected. Treatment and medical assistance are critical.

Treatment for hypothermia:

- Call for emergency medical assistance.
- Do not leave the victim alone.
- Prevent further heat loss by moving the person to a warmer location out of the wind, wet, and cold.
- Remove cold, wet clothing and replace with warm dry clothing or wrap the victim in blankets.
- If the victim is conscious, provide warm liquids, candy, or sweetened foods. Carbohydrates are the food most quickly transformed into heat and energy. Do not give the victim alcohol or caffeine.
- Have the person move their arms and legs to create muscle heat. If they are unable to move, place warm bottles or hot packs in the arm pits, groin, neck, and head. Do not rub the arms and legs or place the person in warm water.

## **Prevention and Protection**

The following general guidelines are recommended for preventing or minimizing cold stress:

- Wear loose, layered clothing, masks, woolen scarves, and hats. Wear liners under hard hats
- Protect hands with gloves or mittens.
- Never touch cold metal with bare hands.
- Wear waterproof, slip-resistant, insulated boots
- Use chemical foot and hand warmers (commercially available) inside boots and gloves.
- In extreme cold, cover the mouth and nose with wool or fur to “pre-warm” the air you breathe.
- If wearing a face protector, remove it periodically to check for frostbite.

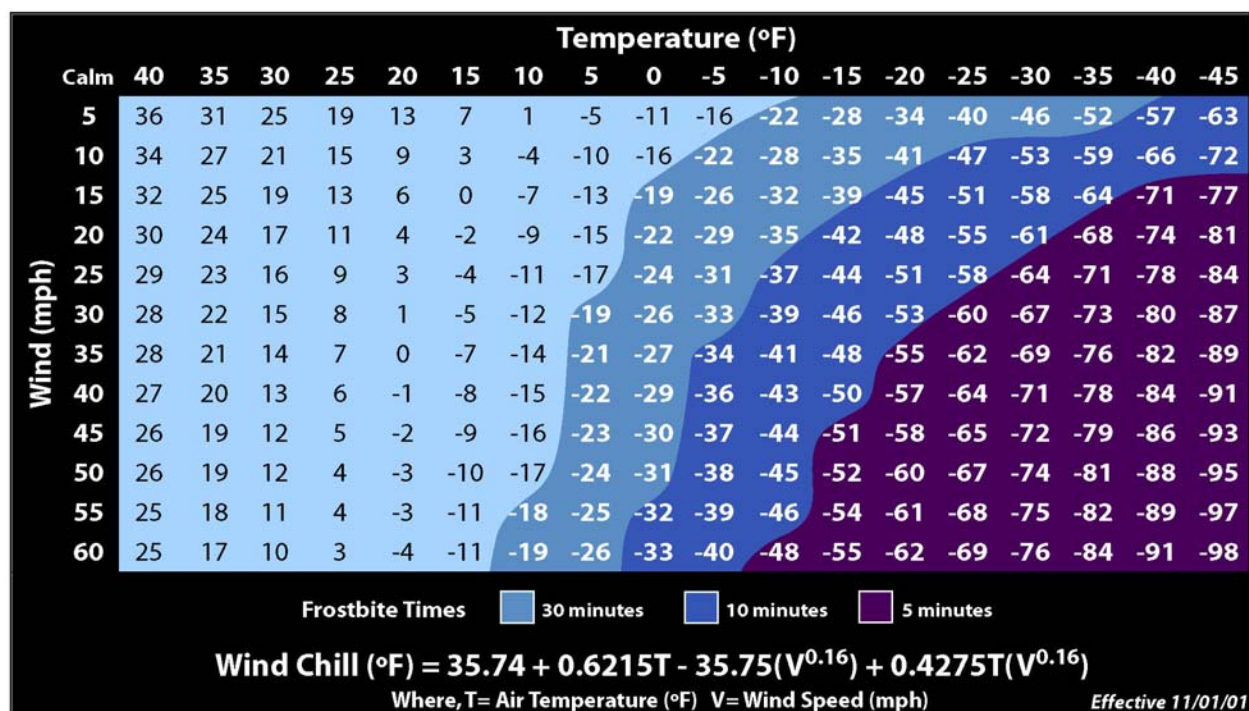


- Ensure that clothing remains secure around the body, especially at the neck and waist.
- If required to wear chemical protective clothing, remember that it generally does not afford protection against cold stress. In many instances, chemical protective clothing increases susceptibility. Dress carefully if both chemical protection and thermal insulation are required.
- Remove outer layers to avoid overheating and soaking clothing with perspiration; replace layers to avoid becoming chilled.
- Keep clothes dry by wearing water-resistant and wind-resistant clothing and outerwear.
- Wear clothing that will “breathe” or allow water vapor to escape.
- Eat well-balanced meals, ensure adequate intake of liquids and avoid alcoholic beverages. Drink warm sweet beverages and soups. Limit the intake of caffeinated drinks due to the diuretic and circulatory effects.
- Utilize available warm shelters and implement work-rest schedules.
- If warm shelters are not available, use cars/vehicles as shelter from the cold. (Ensure that tailpipes are not covered by heavy snowfall).
- Use radiant heaters to provide warmth (if using propane heaters ensure adequate ventilation to avoid carbon monoxide poisoning).
- Monitor yourself and others for changes in physical and mental condition.
- Use the buddy system or supervision to ensure constant protective observation.
- If heavy work must be done, resulting in sweating/wet clothing, take rest periods in heated shelters and change into dry clothing as necessary.
- New employees should not work full-time in the cold during the first days of employment until they become accustomed to the working conditions and the use of required protective clothing.
- Include the weight and bulkiness of clothing in estimating the required work performance and weights to be lifted by the worker.
- Arrange the work in such a way that sitting or standing still for long periods is minimized.
- Perform work protected from drafts to the greatest extent possible. If possible, shield the work area from wind.
- Instruct workers in safety and health procedures. The training program should include, as a minimum, instruction in:
  - Signs and symptoms of frostbite, impending hypothermia, or excessive cooling of the body
  - Proper use of clothing
  - Proper eating and drinking habits
  - Safe work practices
  - Proper rewarming procedures and appropriate first aid treatment
- Tables 1 and 2 should be consulted to adjust working schedules for wind chill conditions based on equivalent chill temperature (ECT). These tables are guidelines only; ambient temperatures and wind conditions should be monitored frequently and work schedules adjusted as required. If workers show signs or symptoms of cold stress, the work schedule must be adjusted, as required.

## Work/Warming Regimen

Work should be performed in the warmest part of the day. If work is performed continuously in the cold or winter conditions or where rain or cool winds are expected, provide heated warming shelters, tents, cabins, or break rooms nearby. Encourage workers to use the shelter at regular intervals depending on the severity of the cold exposure. Table 2, Cold Work/Warmup Schedule for 4-Hour Shifts, provides guidance for working in severe cold weather. The onset of heavy shivering, the feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications for immediate return to the shelter. Pain, numbness, or tingling in the extremities are indications for immediate return to the shelter. When entering the heated shelter, the outer layer of clothing should be removed and the remainder of the clothing loosened to permit sweat evaporation, or the worker should change into dry clothing. Never return to work in wet clothing.

**Table 1. Wind Chill Chart**



**Table 2. Cold Work/Warmup Schedule for 4-Hour Shifts**

EQUIVALENT CHILL TEMPERATURE	MAXIMUM WORK PERIOD	NO. OF BREAKS
≥-24°F	Normal	1
-25° to -30°F	75 minutes	2
-31° to -35°F	55 minutes	3
-36° to -40°F	40 minutes	4
-41° to -45°F	30 minutes	5
≤-46°F	Stop work	Stop work

## **FLD 11 ROUGH TERRAIN/ATV USE**

### **RELATED FLDs**

*FLD 02 – Inclement Weather*

*FLD 05 – Heat Stress Prevention and Monitoring*

*FLD 06 – Cold Stress*

*FLD 22 – Heavy Equipment Operation*

*FLD 47 – Clearing, Grubbing, and Logging Operations*

*FLD 57 – Motor Vehicle Safety*

### **HAZARD**

Physical hazards associated with rough terrain include vehicle accidents, heavy equipment incidents, falling, slipping, and tripping.

Driving vehicles on uneven surfaces creates a possibility of the vehicle rolling, getting stuck in mud or ditches, or of an accident due to flat tires or striking obstacles and other vehicles.

When working on foot, steep inclines and heavy or downed vegetation can hide holes or breaks in the terrain, increasing the risk of slips, trips, and falls.

### **RECOGNITION AND RISK ASSESSMENT**

Rough terrain complicates work activities and adds to or increases risk. In the planning stages of a project, rough terrain must be considered as a physical hazard and identified in the site-specific health and safety plan (HASP). Risk assessment is usually accomplished from site history information (i.e., site topography) and on site by the Field Safety Officer (FSO).

### **HAZARD PREVENTION AND PROTECTION PROGRAMS**

#### **Safety on Foot**

Personnel working on rough terrain should maintain a high level of physical conditioning due to increased body stress and exertion.

The site crew should be alert and observe terrain while walking to minimize slips, trips, and falls.

Boots should be ankle high or higher to provide additional support and stability.

Work will be completed in adequate natural light or sufficient illumination will be maintained.

Site personnel will conduct an initial walkover and the “buddy system” will be implemented.

Emergency communications such as a cell phone or two-way radio should be carried at all times.

Personnel should be aware of potential hazards and ensure the availability of first-aid supplies and knowledge of the location of the nearest medical assistance.

#### **VEHICLE SAFETY**

Vehicle drivers and passengers will wear seatbelts at all times.

Hazards can be prevented by ensuring regular maintenance is performed on vehicles and all safety features are working. Have brakes and wheel bearings of vehicles used off road or in four wheel drive inspected at increased frequency (suggest inspections at twice the manufacturer's recommended frequency).

In order to minimize accidents, site surveillance on foot may be required to ensure clear driving paths.

Minimize side hill travel. Travel straight up and down hills whenever possible. Passengers will not be allowed when side hill travel is required.

Take into account loads or superstructure of vehicles which raise the center of gravity and increase risk of tipping.

Cross streams, small logs or other passable (there is adequate clearance of the undercarriage) obstructions at right angles.

Four wheel drive vehicles should be used if terrain conditions are wet, frozen, broken, or otherwise deemed unsafe for two wheel drive vehicles by the FSO. Use of vehicles off-road will be specifically addressed in the HASP and personnel operating vehicles will be checked for proficiency.

- Before moving a vehicle in the field, first walk the route of travel, inspecting for depressions, stumps, gullies, ruts, and similar obstacles.
- Always check the brakes of a vehicle before traveling, particularly on rough, uneven, or hilly ground.
- Check the complete drive train of a carrier at least weekly for loose or damaged bolts, nuts, studs, shafts, and mountings.
- Engage the all wheel drive when traveling off highway on hilly terrain.
- Increase tire pressures before traveling in hilly terrain (do not exceed rated tire pressure).
- Use the assistance of someone on the ground as a guide when lateral or overhead clearance is close.
- After the vehicle/equipment has been moved to a new site, set all brakes and/or locks. When grades are steep, block the wheels.

## **Definitions**

**Class I, All-terrain vehicle (ATV):** A motorized off-highway vehicle, 50 in. (127 cm) or less in width, having dry weight of 800 lbs (362.9 kg) or less, and traveling on three or more low pressure tires (10 lbs [4.5 kg] psi or less), with a seat designed to be straddled by the operator.

**Class I, Category G, ATV:** An ATV intended for general recreational and utility use.

**Class I, Category U, ATV:** An ATV intended primarily for utility use.

**Class II, ATV:** A motorized off-highway vehicle with a width which exceeds 50 in. (127 cm) or having a dry weight that exceeds 800 lbs (362.9 kg), traveling on four or more low-profile, low-pressure tires (10 lbs [4.5 kg] psi or less) and having a bench seat.

**NOTE:** Utility Vehicles are designed to perform off-road utility tasks such as passenger and cargo transportation and are addressed separately below. Examples are Rangers, Rhino, M-Gators, Gators, and Mules.

Rollover Protective Structure (ROPS). A cab or frame that provides a safe environment for the tractor operator in the event of a rollover.

## **ALL TERRAIN VEHICLES (ATVS)**

### **Qualifications**

ATV operators will have completed a nationally recognized accredited ATV training course (such as provided by the Specialty Vehicles Institute of America or in-house resources that have been certified as trainers by an accredited organization) prior to operation of the vehicle.

The operator must pass an operating skills test prior to being allowed to operate an ATV. Proof of completion of this training will be maintained.

### **Equipment**

All ATVs shall be equipped with:

- An operable audible warning device (horn);
- Headlights (if it will be used during hours of darkness);
- Taillights; and
- Brake lights.
- Mufflers and spark arresters.

All Class II ATVs will be equipped with ROPS and seatbelts

### **Operation**

Only Class I and Class II ATVs with four or more wheels may be used. Class III ATV's may not be used.

The manufacturer's recommended payload will not be exceeded at any time.

Gloves and an approved motorcycle helmet with full-face shield or goggles will be worn at all times while operating a Class I ATV.

An ATV will not be driven on public roadways except to cross the roadway, and it will only be driven on a public roadway at designated crossing points or with a road guard (no paved road use unless allowed by the manufacturer).

A copy of the operator's manual will be kept on the vehicle and protected from the elements (if practicable).

Tires shall be inflated to the pressures recommended by the manufacturer.

Passengers are prohibited on Class I ATVs.

## UTILITY VEHICLES

Utility vehicles are defined as specialty Class II ATVs designed to perform off-road utility tasks such as passenger and cargo transportation. Examples are Rangers, Rhino, M-Gators, Gators, and Mules.

Utility vehicle operators shall be trained and familiar with the use of all controls; understand proper moving, stopping, turning and other operating characteristics of the vehicle. Operators must review all training materials provided by the manufacturer for the specific vehicles, and training should be in accordance with appropriate manufacturer recommendations. A copy of the operator's manual shall be kept on the vehicle at all times and protected from the elements. At a minimum, training should address:

- Basic riding tips from the manufacturer's published literature for each vehicle.
- Reading terrain.
- Climbing hilly terrain.
- Descending a hill.
- Traversing a slope.
- Riding through water.
- Cargo carriers and accessories.
- Loading and unloading.
- Troubleshooting.
- Proper preventative maintenance, (i.e., oil levels, tire pressure requirements and scheduled maintenance requirements according to the manufacturer's guidelines.).

Utility vehicles shall be equipped with:

- Operable audible warning device (horn).
- Headlights.
- Taillights.
- Brake lights.
- Seatbelts.
- ROPS.

Occupancy in utility vehicles is limited to manufacturer designated seating that has built-in seatbelts. Passengers may not ride in the vehicle's back cargo area unless the vehicle is otherwise equipped. Note: When used for emergency response, medical litters may be placed in the back cargo area but must be secured as described below.

The manufacturer's recommended load carrying capacity, personnel capacity, or maximum safe vehicle speed shall not be exceeded at any time.

Cargo items will be secured as necessary to prevent movement/tipping. All loads over fifty pounds (to include medical litters) must be securely strapped to cargo tie-downs in the rear and to the cargo shelf in the front.

Seatbelts will be worn by operators and passengers of specialty vehicles where installed by the manufacturer. Operators and passengers shall wear goggles at all times when a utility vehicle, not equipped with a windshield, is in motion.

Utility vehicles will not normally be driven on public roadways except to cross the roadway, and will only be driven on a public roadway at designated crossing points or with a road guard. Utility vehicles that are allowed to operate outside a controlled work area and/or on public roads will meet the minimum vehicle safety standards in accordance with 49 CFR 571.5, to include ROPs, seatbelts and placement of “Slow Moving Vehicle” emblems where required.

Manufacturer-installed safety equipment will be maintained in working order and used in compliance with the requirement of this regulation and in accordance with manufacturer’s recommendations.

## **RULES**

Observe the following practices to help prevent accidents:

- Do not misuse utility vehicles.
- Reduce speed and exercise extreme caution on slopes or on rough ground.
- Do not overload vehicle and avoid shifting loads. Reduce load when operating over rough or hilly terrain.
- Do not stop or start suddenly when going uphill or downhill. Be especially cautious when changing direction on slopes.
- Stay alert for holes, rocks, and other hidden hazards in the terrain.
- Keep away from drop-offs, ditches, embankments, as well as ponds and other bodies of water. The machine could suddenly turn over if a wheel is over the edge of a cliff or ditch, or if an edge caves in.
- Keep front wheels straight at crest of hill or going over bumps.
- When descending a hill, remove foot from accelerator and apply brakes to reduce speed and maintain control.

## **Transport Loads Safely**

- Be sure load is evenly distributed.
- Do not load above the load guard.
- Securely anchor all loads in cargo box.
- Reduce cargo box capacity when operating on rough or hilly terrain.
- Use existing trails. Avoid terrain such as dangerous slopes and impassable swamps. Watch carefully for sharp bumps, holes, ruts, or obstacles.
- Look ahead at terrain. Know what is coming and be prepared to react. Be alert for hazards.
- Keep front wheels straight at the crest of a hill or going over bumps.
- Reduce speed according to trail, terrain, and visibility conditions.
- The passenger should always use the hand holds.

### **Climbing or Descending a Hill**

- Always use the brakes when going down slopes, the utility vehicle can speed up (freewheel) going down a slope. Engine or clutch braking effect is minimal.
- Balance loads evenly and secure them. Braking could shift the load and affect vehicle stability.
- Sit on the center of the seat and keep both feet within the foot platform.
- Never drive past the limit of visibility. Slow down near the crest of a hill until getting a clear view of the other side.
- If the vehicle stops or loses power going up a hill, lock the park brake to hold the vehicle on slope. Maintain direction of travel and release the brake slowly. Back straight down hill slowly while maintaining control. Do not turn the vehicle sideways. The vehicle is more stable in a straight forward or rearward position.
- If the utility vehicle begins to tip, turn the front wheel downhill to gain control before proceeding.

### **Riding Through Water**

- Avoid water whenever possible. If the drive belt becomes wet, slippage will occur and the vehicle will lose power.
- Never cross any body of water where the depth may be unknown to the operator. As an operational guideline, deep water is considered anything in excess of 152 mm (6 in.) in depth. Tires may float, making it difficult to maintain control.
- Choose a course within the waterway where both banks have a gradual incline. Cross at a point known to be safe.
- Proceed at a slow steady speed to avoid submerged obstacles and slippery rocks.
- Avoid water crossings where the operation of a utility vehicle may cause damage to waterway beds or erode waterway shoreline.



## **FLD 22 EARTH MOVING EQUIPMENT/MATERIAL HANDLING EQUIPMENT**

### **REFERENCES**

*29 CFR Part 1926 Subparts 600-602*

### **RELATED FLDs**

*FLD 23 – Cranes, Rigging, and Slings*

*FLD 24 – Aerial Lifts/Manlifts*

*FLD 34 – Utilities*

*FLD 35 – Electrical Safety*

### **PROCEDURE**

These rules apply to the following types of earthmoving equipment: scrapers, loaders, crawler or wheel tractors, bulldozers, off-highway trucks, graders, agricultural and industrial tractors, and similar equipment.

#### **Machinery and Mechanized Equipment Safety**

Before any machinery or mechanized equipment is placed in use, it will be inspected and tested by a competent mechanic and certified to be in safe operating condition.

WESTON will designate a competent person to be responsible for the inspection of all machinery and equipment daily and during use to make sure it is in safe operating condition. Tests will be made at the beginning of each shift during which the equipment is to be used to determine that the brakes and operating systems are in proper working condition.

Preventative maintenance procedures recommended by the manufacturer will be followed.

Any machinery or equipment found to be unsafe shall be removed from service and its use prohibited until unsafe conditions have been repaired or corrected.

Inspections or determinations of road conditions and structures will be made in advance to ensure that clearances and load capacities are safe for the passing or placement of any machinery or equipment.

Machinery and mechanized equipment will be operated only by designated personnel. Equipment deficiencies observed at any time that affect safe operation will be corrected before continuing operation.

Seat belts shall be provided on all equipment covered by this section and shall meet the requirements of the Society of Automotive Engineers (J386-1969) and Seat Belts for Construction Equipment. Seat belts for agricultural and light industrial tractors shall meet the seat belt requirements of Society of Automotive Engineers (J333a-1970), Operator Protection for Agricultural and Light Industrial Tractors.

Seat belts shall be worn when provided by the manufacturer. Passengers shall not be allowed to ride on equipment unless equipment is designed with additional seats with safety belts.

**Audible alarms.** All bi-directional machines, such as rollers, compacters, front-end loaders, bulldozers, and similar equipment, shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction. The horn shall be maintained in an operative condition.

Getting off or on any equipment while it is in motion is prohibited.

Machinery or equipment requiring an operator will not be permitted to run unattended.

Machinery or equipment will not be operated in a manner that will endanger persons or property, nor will the safe operating speeds or loads be exceeded.

All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done. The only exemption is equipment designed to be serviced or maintained while running.

All repairs on machinery or equipment will be made at a location that will provide protection from traffic or other hazards to maintenance personnel.

Machinery and equipment, or parts thereof, that are suspended or held apart by slings, hoists, or jacks also will be substantially blocked or cribbed before personnel are permitted to work underneath or between them.

Bulldozer and scraper blades, front end-loader buckets, dump bodies, and similar equipment will be either fully lowered or blocked when being repaired or when not in use. All controls will be in a neutral position, with the engines stopped and brakes set, unless work being performed on the machine requires otherwise.

Stationary machinery and equipment will be placed on a firm foundation and secured before being operated.

All points requiring lubrication during operation will have fittings so located or guarded to be accessible without hazardous exposure.

When necessary, all mobile equipment and the operating area will be adequately illuminated while work is in progress.

Mechanized equipment will be shut down prior to and during fueling operations. Closed systems, with automatic shutoff that will prevent spillage if connections are broken, may be used to fuel diesel powered equipment left running.

All towing devices used on any combinations of equipment will be securely mounted and structurally adequate for the weight drawn.

Persons will not be permitted to get between a piece of towing equipment and the item being towed until the towing equipment has come to a complete stop.

All equipment with windshields will be equipped with powered wipers. Vehicles that operate under conditions that cause fogging or frosting of windshields will be equipped with operable defogging or defrosting devices.

All equipment left unattended at night, adjacent to a highway in normal use, or adjacent to construction areas where work is in progress, will have lights or reflectors, or barricades equipped with lights or reflectors, to identify the location of the equipment.

Whenever the equipment is parked, the parking brake will be set. Equipment parked on inclines will have the wheels chocked or track mechanism blocked and the parking brake set. Equipment such as lift trucks and stackers will have the rated capacity posted on the vehicle so as to be clearly visible to the operator. When auxiliary removable counterweights are provided by the manufacturer, corresponding alternate rated capacities also will be clearly shown on the vehicle. The ratings will not be exceeded.

Steering or spinner knobs will not be attached to the steering wheel unless the steering mechanism prevents road reactions from causing the steering hand wheel to spin. When permitted, the steering knob will be mounted within the periphery of the wheel.

All industrial trucks in use will meet the requirements of design, construction, stability, inspection, testing, maintenance, and operation, defined in American National Standards Institute (ANSI) B56.1, Safety Standards for Powered Industrial Trucks.

The installation of live booms on material and personnel hoists is prohibited.

The controls of loaders, excavators, or similar equipment with folding booms or lift arms will not be operated from a ground position unless so designed.

Personnel will not work or pass under the buckets or booms of loaders in operation.

Cranes and any other equipment used for lifting must be inspected as required and records of inspection must be maintained.

### **Drill Rigs**

See FLD 56, *Drilling Safety*

## **FLD 28 EXCAVATING/TRENCHING**

This procedure identifies the basic requirements for the protection of personnel working in and around excavations and trenches, including identification of hazards, classification of soils, protective systems, and inspections. Trenching and excavation work will be done in conformance with this procedure, and with 29 Code of Federal Regulations (CFR), 1926 Subpart P (Excavations) as well as any state, local, and client requirements.

### **REFERENCES**

29 CFR 1926 Subpart P (Excavations)

### **ATTACHMENTS**

Attachment 1 – Inspection-Permit Checklist

Attachment 2 – Audit Checklist

### **RESPONSIBILITIES**

The responsibilities of the personnel involved in any trenching and excavation work are:

- Project Manager (PM)/Site Manager (SM): In addition to their normal safety responsibilities as described in the Safety Program Implementation Plan, the PM or SM will be responsible for identifying and checking the qualifications of the competent persons whom they designate for excavation or trenching activities at their project site.

Competent Person: For the purpose of this procedure, the competent person is one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous or dangerous to employees and who has authorization to take prompt corrective actions to eliminate them. The competent person in excavations must have knowledge of regulatory requirements and the necessary technical skills (e.g., soils classification, use of protective systems) to implement this operating practice and address any necessary client concerns or requirements. The competent person must be a Registered Professional Engineer (PE) with experience in soil classification and stability analysis for excavations in excess of 20 feet in depth, excavations that intersect, excavations close enough to buildings, or other surface appurtenances that they could exert stress on the excavation side walls.

The competent person may be the Field Safety Officer (FSO), a subcontractor representative or other site person. The competent person must be identified in writing and understand the role and responsibilities of the competent person.

### **Hazard Assessment and Evaluation**

Prior to any excavation activity the FSO and the competent person must evaluate the site for known or potential hazards. Potential hazards affecting trench safety can include the following:

- Excess water from rainfall, snowmelt or frozen soils, and temperature extremes affecting soil moisture content.
- Previous excavation area (requires Type C soils classification).
- Depth of excavation (influences soil stability by increased weight; average soils weigh approximately 100 pounds per cubic foot).

- Surcharge loads (e.g., evaluate location of buildings, spoils piles, poles, pavement, other structural objects).
- Location of personnel and equipment.
- Vibration by equipment, traffic, railroads, explosives, etc.
- Undermining of structures.
- Duration of exposure (limit the time-frame of the excavation to the minimum possible).

Prior to excavation or trenching, utility companies or owners shall be contacted and requested to identify the exact location of installations in the area. WESTON FLD 34, "Utilities" must be followed. If the companies or owners do not respond within 24 hours or the period established by law or ordinance, or if they cannot establish the exact location of underground installations, WESTON or a subcontractor may proceed with the excavation following WESTON FLD 34 to determine other acceptable means to locate utility installations. The known or estimated location of utilities must be marked or staked for identification purposes. Workers and equipment operators must also be aware of overhead utilities.

When excavation operations approach the estimated location of underground installations, the exact location is to be determined by safe and acceptable means.

The stability of adjacent structures is to be assured in any event (whether employees will enter an excavation or not).

All surface encumbrances that are located to create a hazard to employees shall be removed or supported, as necessary. Structures near the excavation shall be underpinned or provided with a support system to prevent collapse.

If the excavation is in an area known or suspected to be contaminated with unexploded munitions or military ordnance, clearance by qualified explosive ordnance disposal (EOD) personnel shall be accomplished prior to excavation work. Work will be performed in accordance with an approved unexploded ordnance (UXO) plan.

### **Pre-Entry Requirements**

While not required as documentation by Occupational Safety and Health Administration (OSHA) regulations (with the exception the utility clearances noted above and in certain states, e.g., California where a permit is required from the State for certain excavations), the Excavation Inspection-Permit (Attachment 1) should be utilized as a guideline in preparation for excavation activities. This checklist or similar approved form, subcontractor form, or site-specific form shall be completed by the competent person prior to the start of operations each day and as needed throughout the shift (See Inspections and Enforcement Section) to document required inspections. The SM shall ensure that monitoring and inspections are performed periodically to verify compliance. Note that clients, in particular Department of Defense (DoD) may require dig or excavation permits as well. These must be in-hand and posted if required before excavation begins and must be renewed as specified by the client.

The competent person shall classify the type of soil using at least one visual and one manual test in accordance with 29 CFR 1926 Subpart P, Appendix A or assume all soils are class C and stipulate appropriate protection methods as for Class C soil. Where tests are performed, the tests shall be documented, including the date(s) of the tests, type of tests, any instrumentation used for testing, location of the excavation tested, the results of the tests and type of soil (A, B, C, or stable rock) indicated by the

test, and the name of the person performing the tests or the report must state that soils will be treated as Class C soils.

The competent person must test the atmosphere in any excavation greater than 4 feet in depth where the potential exists for a known or potential hazardous atmosphere (e.g., landfills, spills before employees are allowed to enter the excavation). Emergency rescue equipment shall be provided and readily available, properly functioning, and attended by qualified personnel when hazardous atmospheric conditions exist or may develop. Based upon the direction of the competent person or the FSO an excavation less than 4 feet deep may require monitoring.

### **Entry Procedures**

While the excavation is open, underground installations shall be protected, supported, or removed as necessary to safeguard employees.

A barricade or other suitable warning system shall be used to alert workers, equipment, and vehicle operators of an excavation's location if the edge of the excavation is not readily apparent. Consult Corps of Engineers EM 385-1-1, (current edition), Section 25 for special requirements related to excavation guarding requirements. If the edge of an excavation is adjacent to a public roadway or an area of high volume site traffic it shall have a suitable barricade, such as a 2- to 3-foot (ft) high berm or jersey barriers, installed along the exposed side of the route. Appropriate barricades shall not interfere with placing overburden a safe distance from the excavation, but they shall have sufficient strength to prevent vehicles from entering the excavation.

Excavations located in areas subject to public traffic must be protected by fencing or barricades constructed with equivalent strength to standard guardrails. The location of fencing or guardrails must be such that risk to the public is minimal.

If the excavation is not subject to public exposure, but is routinely exposed to employees and is either 1) deeper than 6 feet or 2) contains hazards (e.g., impalement, hazardous substances) then perimeter protection is to consist of warning barricades or flagging placed no closer than 6 feet from the excavation edge. Warning barricades or flagging should be between 3 and 4 feet in height.

If the excavation edge is not readily visible and does not meet any of the criteria identified above, perimeter protection of warning flags or barricades (see above) located between 2 and 6 feet from the excavation edge is required.

Working at the edge of the excavation must be minimized. Based upon the hazard evaluation, fall protection in the form of harnesses and lifelines, may be required if workers must observe activities at the edge of an excavation greater than 6 feet deep.

Lighting for excavations and barricades during nighttime or low visibility situations must be in accordance with state or local requirements.

All shafts, pits, wells, etc., where no work is being performed shall be covered with material of sufficient strength to support foreseeable loads, or shall have a standard guardrail or equivalent protection installed around the perimeter, or shall be backfilled.

Walkways and bridges with standard guardrail systems shall be provided where people or equipment are required or permitted to cross over excavations.

Employees in excavations or trenches shall not be permitted to work in the immediate vicinity of excavation equipment nor to work under loads handled by such equipment. Employees shall not be allowed to work above other employees in the excavation unless the employees working below are adequately protected.

Employees shall not be allowed to work in excavations where water has accumulated or is accumulating unless diversion ditches, dikes, or other means shall be used to prevent surface water from entering an excavation and to provide drainage to the adjacent area. Pumps, if used to control water accumulation, must be monitored continuously.

Only authorized personnel are allowed within excavations. The number of workers within an excavation must be maintained to the minimum necessary to accomplish the assigned work.

A ladder, stairway, ramp or other means of exiting excavations 4-feet deep or more will be provided for employees within 25 feet of lateral travel of any location within the excavations. Ramps used for employee access or egress must be sloped to allow the employee to walk in an upright manner without assistance. Ramps for equipment access or egress must be designed by a registered PE.

Spoils and other materials are to be placed at sufficient distance from the edge of the excavation to prevent excessive loading on the face of the excavation. In no event is any material to be placed closer than 2 feet from the edge.

Personnel will be evacuated from any excavation when the walls show signs of distress and personnel are potentially impacted.

### **Protective Support Systems**

Employees in an excavation shall be protected from cave-ins by an adequate protective system designed in accordance with the following. Exceptions to the requirement for employee protective systems include; excavations entirely in stable rock and excavations which are less than 5 feet deep and examination by the competent person provides no indication of a potential cave-in. Protective system options include:

- Proper sloping or benching of the sides of the excavation (benching is not permitted for Class C soils). Follow specific requirements of 29 CFR 1926 Subpart P, specifically 1926.652.
- Supporting the sides of the excavation with a properly designed and installed shoring or shielding system (e.g., hydraulic shoring, trench jacks, air shores, or trench boxes/shields).

Follow specific requirements of 29 CFR 1926 Subpart P, specifically 1926.652. Protective systems outlined within the OSHA standard are minimum requirements. In the event soil conditions change, re-inspect the system. Additional cut backs on the slope angle may be necessary based upon conditions encountered.

Protective systems for use: in excavations greater than 20 feet in depth; where trenches intersect; or where buildings or other surface structures or appurtenances can exert stress on the excavation, walls must be designed by a Registered PE.

### **Inspections and Enforcement**

The competent person must inspect the excavation and the adjacent area frequently for possible cave-ins, for failure of protective systems and equipment, for hazardous atmospheres, or for other hazardous

conditions. Inspections are also required after any occurrence that could increase the potential hazard to employees. The minimal inspection requirement is daily. Competent persons must be on site or immediately available when persons are working in or directly adjacent (within the prescribed safety zone). Natural events, such as rain, freezing or thawing weather, or man-made events, such as blasting and vibration, are examples of situations requiring more frequent inspection.

Daily and as-needed inspections must be documented on applicable portions of the Inspection-Permit (Attachment 1), the Audit Checklist (Attachment 2), or an approved documentation form. The Audit Checklist is designed as a more comprehensive inspection/audit document. All inspections shall be documented.

During inspections, danger signs that should be evaluated can include the following:

- Bulges in the side walls.
- Cracks running parallel to the excavation edge.
- Material sloughing into the excavation.
- Exposed utilities.
- Loose chunks of the excavation edge or lip breaking up.
- Rocks, or refuse from earlier work or any other material that could fall from the excavation walls.
- Undermined structures, poles, or trees.
- Water seepage.
- Spoils piles or other materials too close to the excavation edge.
- Apparent changes in soil classification.

Failure to follow procedures outlined within this FLD will result in documented noncompliance with the requirements of this FLD. Such noncompliance will result in a management-imposed suspension of the activity and may include disciplinary action.

### **Emergency Operations**

The Health and Safety Plan (HASP) must indicate names and phone numbers for any potentially affected utility (e.g., phone, gas, electric, pipelines, public works). The HASP must include a plan for rescuing persons trapped within an excavation.

If a utility is damaged due to the excavation operation, and damage has occurred, operations are to cease. Personnel are to move to a safe location until the hazard has been resolved. The owner of the utility and any other necessary emergency resources are to be contacted immediately.

In the event of a trench failure with subsequent employee entrapment the following procedures should be followed:

- Immediately contact the local rescue agency listed in the HASP. Give the agency the exact location, number of victims, trench measurements, and any special hazards encountered.
- Keep all life-support and de-watering systems operating.
- Clear workers away from the excavation.
- Shut down any heavy equipment nearby.
- Be prepared to meet and brief rescue personnel.
- Never attempt to dig out victims with heavy equipment.



**Records/Reports/Notifications**

The following records shall be maintained in the site files:

- Excavation inspection records.
- Soil classification test records.
- Evaluations of need to stabilize adjacent structures.
- Structural ramp designs.
- Approved tabulated data used for protective systems.
- Protective system designed by a PE

**ATTACHMENT 1**  
**INSPECTION-PERMIT CHECKLIST**

## WESTON EXCAVATION INSPECTION-PERMIT CHECKLIST

DATE: \_\_\_\_\_ TIME: \_\_\_\_\_ LOCATION: \_\_\_\_\_

DESCRIPTION OF EXCAVATION: \_\_\_\_\_

PERSON IN CHARGE OF WORK: (SAFETY WATCH, If applicable) \_\_\_\_\_

Item	Y	N	Comment
Is there a competent person on site?			
Have utilities been located?			
Will excavation be less than 5 ft in depth? If yes, has competent person determined appropriate worker protection?			
Will excavation be greater than 5 ft in depth? If yes, complete remainder.			
Will workers in or near top or face of excavation be adequately protected?			
What is expected soil type? _____ Is protection (sloping, benching, shoring, sheeting, or shielding) according to 29 CFR Part 1926.652?			
If sloping/benching used: Angle no greater than 1½ horizontal to 1 vertical (34°)? Conforms to Appendix B, 29 CFR Part 1926.652 for type C soils? Conforms to Appendix A or B? Conforms to other published tables that are onsite? Is designed by competent PE?			
If shoring, sheeting, or shielding is used: Designs based on Appendices A, C, D, or G of 29 CFR Part 1926.652? Designed and used according to manufacturer's specifications and instructions? Design is according to published tables that are onsite? Design is by a competent PE?			
If Appendix A of 29 CFR Part 1926.652 is used, indicate soil classification _____. Is classification based on at least one manual and one visual test?			
Is plan for installation and removal of support systems appropriate?			
Is planned protection for surface encumbrances appropriate?			
Are there adequate provisions for access and egress?			
Is plan for protection from vehicular traffic adequate?			
Are barriers and lighting provided for pedestrian and vehicle protection?			
Is plan adequate for protection from exposure to falling loads?			
Is there an adequate proximity warning system for mobile equipment?			
Does plan adequately address hazards of/protection from accumulating water?			
Does plan adequately take into account stability and potential impact of adjacent structures?			
Is plan for protection from loose soil or rock adequate?			

Item	Y	N	Comment
Inspections will be conducted of excavation and adjacent areas: Prior to start of work? Daily? After rain storms or other hazard increasing occurrences? Are inspections documented?			
Is fall protection adequate?			
Is there a potentially hazardous environment? If yes, complete the following table.			
Is appropriate emergency/rescue equipment available?			

Testing	PEL/Action Level	Concentration/Time			
Percent Oxygen	19.5-23.5%				
Percent LEL	> 20%				
*Carbon monoxide	35 ppm				
*Hydrogen sulfide	10 ppm				

\*If applicable

### ADDITIONAL REQUIREMENTS

Item	Y	N	Comment
Hot work permit required?			
Confined entry procedures and permits required?			
Have all employees reviewed and signed HASP?			

### EMERGENCY PLAN EMERGENCY TELEPHONE NUMBERS:

Fire Department: \_\_\_\_\_ Police Department: \_\_\_\_\_  
Ambulance: \_\_\_\_\_ Medical: \_\_\_\_\_

### EMERGENCY EQUIPMENT

Fire Extinguisher - Type: _____ Location: _____	First Aid Kit - Locations: _____ _____
Rescue Breathing Apparatus - Location: _____ _____	Non-powered digging tools - Location: _____ _____
Life Line Systems - Location: _____ _____	

Field Safety Officer: \_\_\_\_\_ Competent Person: \_\_\_\_\_

Registered Professional Engineer: \_\_\_\_\_

**EMPLOYEES:**

<b>Name (Please Print)</b>	<b>Signature</b>	<b>Duties</b>

**ATTACHMENT 2**  
**AUDIT CHECKLIST**

## WESTON EXCAVATING/TRENCHING AUDIT CHECKLIST

Project: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Inspector: \_\_\_\_\_ Excavation Location: \_\_\_\_\_

Excavation Depth: \_\_\_\_\_ Anticipated Maximum Depth: \_\_\_\_\_

	Y	N	Comment
All excavations inspected?			If no, why not? _____
Soil type verified for each excavation?			Indicate Type: _____
Competent person identified?			Name: _____
PE involved?			Name: _____

**NOTE:** For California operations, a trenching permit issued by the Division of Occupational Safety and Health (DOSH) is required prior to beginning work on any excavation or trench 5 ft deep or deeper in which employees will be required to work.

This inspection list is designed to assist in verifying inspection requirements established in 29 CFR Part 1926.560-562 Subpart P and Cal/OSHA 8 CCR 341, 1540 and 1541.

### A. TRAINING

	Y	N	Comments
1. Have employees been trained in hazard recognition and safe work practices associated with excavation work?			
2. Have employees been trained in excavation emergency procedures?			

### B. SURFACE ENCUMBRANCES (Trees, Boulders, Telephone Poles, Heavy Equipment)

	Y	N	Comments
1. Are all surface encumbrances posing a threat to employees identified, removed, or supported?			

### C. UNDERGROUND UTILITIES/INSTALLATIONS (Electric, Gas, Fuel, Product, Water, Telecommunication, Sewer, Lines, etc.)

	Y	N	Comments
1. Are utility searches completed and documented?			
2. Have the appropriate agencies/client representatives been contacted?			
3. Are local permits obtained and on file?			
4. If excavation will impinge on underground utilities: Are procedures in place to detect/protect as utilities are neared? Are procedures in place to guard/support exposed utility lines?			

#### D. ACCESS AND EGRESS

	Y	N	Comments
1. Are ladders, stairways, or ramps provided every 25 ft of linear travel in excavations 4 ft deep or deeper?			
2. Are ladders appropriately secured and extend at least 3 ft above the top landing area?			
3. Are personnel and equipment access and egress ramps designed by a competent person?			
4. Are ramps/runways of two or more structural members joined so as to prevent displacement?			
5. Are structural members of ramps/runways of two or more members of uniform thickness?			
6. Are the cleats or other appropriate means used to connect runway structural members attached to the bottom of the runway or in a manner to prevent tripping?			
7. Are all structural members slip-resistant?			

#### E. EXPOSURE TO VEHICULAR TRAFFIC

	Y	N	Comments
1. Are appropriate warning signs or barriers used to protect employees who are exposed to vehicular traffic?			
2. Are employees exposed to vehicular traffic provided with and wearing warning vests or other suitable garments marked with or made of reflective or high-visibility material?			

#### F. EXPOSURE TO FALLING LOADS

	Y	N	Comments
1. Are employees permitted underneath loads handled by lifting or digging equipment?			
2. Are employees required to stand away from any vehicle being loaded or unloaded to avoid being stuck by any spillage or falling materials?			
3. Operators should remain in the cabs of vehicles being loaded or unloaded only if the vehicles are equipped, according to 29 CFR Part 1926.601(b)(6), to provide adequate protection for the operator during loading/unloading operations. Are said vehicles so equipped?			

#### G. WARNING SYSTEM FOR MOBILE EQUIPMENT

	Y	N	Comments
1. Does the operator of mobile equipment operated adjacent to an excavation have a clear and direct view of the edge of the excavation?			
2. Is the grade away from the excavation?			
3. If not, and if this such equipment is required to approach the edge of an excavation, is a warning system used (barricades, hand or mechanical signals, or stop logs)?			



## H. HAZARDOUS ATMOSPHERES

	Y	N	Comments
1. Is there potential for hazardous atmosphere in excavations?			
2. If yes, has the atmosphere in the excavations been tested before employees enter?			
3. Is atmosphere monitored at established frequency and documented in Section U, Atmospheric Monitoring Record?			
4. Are adequate precautions taken to prevent employee exposure to atmospheres containing less than 19.5% oxygen and other hazardous atmospheres?			
5. Are adequate precautions are taken to ensure employee exposure is less than 20% lower exposure limit (LEL)?			
6. Is testing conducted as often as necessary to ensure that the atmosphere remains safe?			

## I. EMERGENCY RESCUE EQUIPMENT

	Y	N	Comments
1. Is emergency rescue equipment (breathing apparatus, safety harness and line, basket stretcher, etc.) readily available where hazardous atmospheric conditions exist or may the equipment reasonably be expected to be available during work in an excavation?  Is equipment attended when in use?			
2. Do employees entering bell-bottom pier holes or other similar deep and confined footing excavations wear a harness with a lifeline securely attached? Is the lifeline separate from any line used to handle materials, and is it attended at all times while the employee wearing the lifeline is in the excavation?			

## J. PROTECTION FROM HAZARDS ASSOCIATED WITH WATER ACCUMULATION

	Y	N	Comments
1. Do employees work in excavations in which there is accumulated water, or in excavations in which water is accumulating?  Have adequate precautions been taken to protect employees against the hazards posed by water accumulation?			
2. If water is controlled or prevented from accumulating by the use of water removal equipment, is the water removal equipment and operation monitored by a competent person to ensure proper operation?			
3. If excavation work interrupts the natural drainage of surface water (such as streams), are diversion ditches, dikes, or other suitable means used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation?			
4. Are excavations subject to runoff from heavy rains inspected by a competent person and are they in compliance with paragraphs 29 CFR 1926.651(h)(1) and (h)(2)?			

## K. STABILITY OF ADJACENT STRUCTURES

	Y	N	Comments
1. Are support systems (shoring, bracing, or underpinning) provided to ensure the stability of such structures where the stability of adjoining buildings, walls, or other structures is endangered by excavation operation?			
2. Excavation below the level of the base or footing of any foundation or retaining wall is not permitted unless:			
- A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure.			
- The excavation is in stable rock.			
- A PE has determined that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity.			
- A PE has determined that such excavation work will not pose a hazard to employees.			
3. Are sidewalks, pavements, and appurtenant structures stable? If they are undermined, is a support system or another method of protection provided to protect employees from the possible collapse of such structures?			

## L. PROTECTION OF EMPLOYEES FROM LOOSE ROCK OR SOIL

	Y	N	Comments
1. Are employees protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations?			
2. Is adequate protection (such as scaling to remove loose material or installation of protective barricades) provided to protect employees from loose rock or soil falling or rolling from an excavation face?			

## M. INSPECTIONS

	Y	N	Comments
1. Are inspections conducted prior to the start of work and as needed throughout the shift by a competent person?			
2. Are daily inspections of excavations, the adjacent areas, and protective systems made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions?			
3. Are inspections made after every rainstorm or other hazard-increasing occurrence (freezing, thawing, increased vibration, or new traffic pattern)?			
4. Are inspections documented?			

## N. FALL PROTECTION

	Y	N	Comments
1. Are walkways or bridges with standard guardrails provided where employees or equipment are required or permitted to cross over excavations?			
2. Are adequate barrier physical protection (sufficient to provide protection for vehicles or pedestrians as appropriate) and lighting provided at all remotely located excavations?			
3. Are all wells, pits, shafts, etc., barricaded or covered?			

## O. PROTECTION OF EMPLOYEES IN EXCAVATIONS

	Y	N	Comments
1. Each employee in an excavation is protected from cave-ins by an adequate protective system designed in accordance with paragraphs (b) or (c) of 29 CFR Part 1926.652 unless:			
- Excavations are made entirely in stable rock.			
- Excavations are less than 5 ft (1.52 m) in depth and examination of the ground by a competent person provides no indication of a potential cave-in.			
2. Are employees permitted to work on the faces of sloped/benched excavations at levels above other employees except when employees at the lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment?			
3. Do the protective systems have the capacity to resist, without failure, all loads that are intended or could reasonably be expected to be applied or transmitted to the system?			

## P. DESIGN OF SLOPING AND BENCHING SYSTEMS.

	Y	N	Comments
1. Are slopes and configurations of sloping and benching systems selected and constructed in accordance with the requirements of 29 CFR Part 1926.652:			
- Paragraph (b)(1) (slope angles no greater than 1 1/2:1 [75%] or conforms to slopes and configurations required in Appendix B for type C soils)?			
- Paragraph (b)(2) (slopes and configurations are according to Appendices A and B)?			
- Paragraph (b)(3) (slopes and configurations are according to other published tables that are available onsite)?			
- Paragraph (b)(4) (slopes and configurations are designed by a PE and a copy of the design is onsite)?			

## Q. DESIGN OF SUPPORT SYSTEMS, SHIELD SYSTEMS, AND OTHER PROTECTIVE SYSTEMS.

	Y	N	Comments
1. Designs of support systems, shield systems, and other protective systems shall be selected and constructed by the employer or a designee and shall be in accordance with the requirements of 29 CFR Part 1926.652:			
- Paragraph (c)(1) (designs are based on Appendices A, C, and D)?			
- Paragraph (c)(2) (design is in accordance with manufacturer's tabulated data, specifications, or instructions and a copy of the data is onsite.)?			
- Paragraph (c)(3) (designs use other tabulated data and a copy of the data is onsite)?			
- Paragraph (c)(4) (designed by a PE and a copy of the design is onsite)?			

## R. INSTALLATION AND REMOVAL OF SUPPORT

	Y	N	Comments
1. Are members of support systems securely connected together to prevent sliding, falling, kickouts, or other predictable failure?			
2. Is installation of a support system closely coordinated with the excavation of trenches?			
3. Are support systems installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support system?			
4. Are individual members of support systems subjected to loads exceeding those they were designed to withstand?			
5. Before temporary removal of individual members begins, are additional precautions taken to ensure the safety of employees, such as installing other structural members to carry the loads imposed on the support system?			
6. Removal begins at, and progresses from, the bottom of the excavation. Are members released slowly so as to note any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation?			
7. Does backfilling progress together with the removal of support systems from excavations?			
8. Excavation of material to a level no greater than 2 ft (.61 m) below the bottom of the members of a support system is permitted only if: - The system is designed to resist the forces calculated for the full depth of the trench. - There are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the support system.			

## S. SHIELD SYSTEMS

	Y	N	Comments
1. Are shield systems subjected to loads exceeding those the system was designed to withstand?			
2. Are shields installed in a manner to restrict lateral or other hazardous movement of the shield in the event of application of sudden lateral loads?			
3. Are employees protected from the hazard of cave-ins when entering or exiting the areas protected by shields?			
4. Are employees allowed in areas when shields are being installed, removed, or moved vertically?			
5. Excavation of earth material to a level not greater than 2 ft (.61 m) below the bottom of a shield is permitted only if the shield is designed to resist the forces calculated for the full depth of the trench, and if there are no indications, while the trench is open, of a possible loss of soil from behind or below the bottom of the shield.			

## T. ADDITIONAL COMMENTS

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## U. ATMOSPHERIC MONITORING RECORD

Testing	PEL/Action Level	Conc./Time	Conc./Time	Conc./Time
Percent Oxygen	19.5-23.5% (D)			
Percent LEL	> 20% (withdraw)			
Toxic-	Refer to HASP			

## **FLD 46 CONTROL OF EXPOSURE TO LEAD**

### **REFERENCES**

29 CFR 1926.62

### **RELATED FLDs AND PROGRAMS:**

*Occupational Medical Monitoring Program*

*Personal Protective Equipment Program*

*Respiratory Protection Program*

This FLD provides guidelines for controlling exposure to lead in the workplace. This WESTON-specific instruction applies corporate-wide and may require consultation and interpretation by a Certified Industrial Hygienist for unique applications.

Managers shall ensure employees are properly trained in the provisions of the standard prior to performing activities involving exposure to lead or lead compounds.

### **INTRODUCTION**

Based upon limited differences in compliance requirements between the General Industry and the Construction Industry Standards WESTON policy is to follow compliance requirements as determined in 29 CFR 1926.62, "Lead Exposure in Construction" for all activities which involve occupational exposure to lead. The forms of lead to which the standard applies is defined to include metallic lead, all inorganic lead compounds, and organic lead soaps.

This practice applies to occupational exposure to lead at or above the Action Level (AL). Specific requirements for medical monitoring, respiratory protection, hygiene facilities, etc. are not mandated until exposure reaches the AL or the Permissible Exposure Level (PEL).

The lead standard includes requirements addressing exposure assessment, methods of compliance, respiratory protection, protective clothing and equipment, hygiene facilities and practices, medical surveillance, medical removal protection, employee information and training, signs, recordkeeping, and observation of monitoring.

The lead standard lists specific tasks which require conformance with the most restrictive portions of the standard until monitoring indicates otherwise. The tasks include; abrasive blasting, welding, cutting and burning of steel or structures containing or coated with lead or lead products.

### **Permissible Exposure Level (PEL) and Action Level (AL)**

For both the general industry and the construction industry, the PEL for lead exposure is 50 $\mu$ g/m<sup>3</sup> and the AL is 30 $\mu$ g/m<sup>3</sup>.

For exposures greater than an 8-hour day, the time-weighted average (TWA) for that day must be reduced according to the formula:

- Allowable employee exposure (in  $\mu$ g/m<sup>3</sup>) = 400 divided by the hours worked that day.

## Potential Sources of Exposure

For WESTON operations, potential sources of exposure include, but are not limited to; industrial hygiene surveys, wet-process paint chip sampling, and drilling operations where lead is present as a contaminant.

In addition, certain "Trigger Tasks" such as; welding and cutting on lead paint or lead-contaminated structures, dry sanding or scraping, soldering and pipe-fitting operations involving lead-containing materials and dry cleanup of lead contaminated surfaces are potential exposure operations. Specific monitoring and protection requirements follow.

## Exposure Assessment and Initial Requirements

Each task conducted by WESTON personnel must be evaluated as to the potential for exposure to lead. In accordance with the standard, exposure is that which would occur regardless of the use of respiratory protection. Therefore, any concentration must be evaluated as to the potential for employee exposure at or above the AL.

## Hygiene Surveys and Sampling Tasks

Previous data less than 12 months old may be used as the initial exposure assessment in order to determine appropriate levels of protection. This data must have been collected under workplace and environmental conditions closely resembling current task activities.

Defensible data from previous soil sampling efforts may be utilized for determining preliminary levels of protection, by inserting soils concentration data into the action levels formula. Refer to the Corporate Environmental Health and Safety Portal Site under "Technical Resources" for guidance on calculating Action Levels. Personal air sampling must still be performed in order to verify exposure until and/or unless comprehensive background data (reviewed by an industrial hygienist) are available to justify omitting personal sampling.

Other objective data may be utilized in lieu of initial monitoring provided the objective data is documented and appropriate for the materials and work processes/activities conducted.

## Trigger Tasks

Until such time as an exposure assessment (either through personal air sample results or approved and documented historic data) has been conducted which indicates actual exposures, the following task-specific guidelines are applicable.

- Where lead-containing coatings or paint are present: Manual demolition of structures (e.g., dry wall), manual scraping, manual sanding, heat gun applications, and power tool cleaning with dust collection systems; and/or spray painting with lead paint. It will be presumed that the level of lead in the air is above the PEL but, below  $500 \mu\text{g}/\text{m}^3$ . The minimum respiratory protection for these activities is a properly fitted half-face respirator with N, R, or P100 filter cartridges. Respirators providing higher levels of protection may be used and an employee has the right to request a powered air-purifying respirator (PAPR) with N, R, or P100 Cartridges.
- Where activities involve using lead-containing mortar; lead burning where lead-containing coatings or paint are present: rivet busting; power tool cleaning without dust collection systems; cleanup activities where dry expendable abrasives are used; and abrasive blasting enclosure movement and removal, it will be presumed that the level of lead in the air is above the  $500 \mu\text{g}/\text{m}^3$  but below  $1250 \mu\text{g}/\text{m}^3$ . The minimum respiratory protection for these activities is a loose-



fitting hood or helmet PAPR with N, R, or P100 filter cartridges; a hood or helmet supplied air respirator operated in continuous flow mode (e.g. type CE abrasive blasting helmet operated in continuous flow mode). A Quantitative Fit Test is required for use of respiratory protection for these activities. Respirators providing higher levels of protection may be used. For WESTON personnel the minimum respiratory protection is a tight fitting full face respirator with N, R, or P100 filter cartridges unless an exception is approved by a WESTON Certified Industrial Hygienist.

**Note:** An employee has the right to request a PAPR with N, R, or P 100 Cartridges.

- Where activities involve: Abrasive blasting, welding, cutting, or torch burning, the respiratory protection required is any supplied air respirator operated in positive pressure mode.
- For any activity where it is reasonably believed that exposure over the PEL will result, the respiratory protection is: Half- or Full-Face air purifying respirator (APR) with appropriate high efficiency filters; PAPRs with appropriate cartridges; or Supplied Air Respirators. Actual selection is dependent upon the potential for exposure.

Until the employee exposure assessment (personnel monitoring or approved historic data) has been performed and actual employee exposure has been determined, all employees performing the tasks described in the paragraphs above in this section must be supplied with interim protection as follows:

- Appropriate respiratory protection.
- Appropriate personal protective clothing and equipment.
- Change areas.
- Hand washing facilities.
- Biological monitoring.
- Training.

## **Monitoring**

### **Initial Monitoring Requirements**

The exposure assessment results will be used to determine whether any employee is being exposed to lead at or above the action level of  $30\mu\text{g}/\text{m}^3$ .

With the exception of allowances described below, monitoring for worker exposure requires collection of personal air samples which are representative of a full shift for each task involving known or potential exposure and any of the following, relevant considerations:

- Any information, observations, or calculations which would indicate employee exposure to lead;
- Any previous measurements of airborne lead; and
- Any employee complaints of symptoms which may be attributable to exposure to lead.

**Note:** Monitoring for the initial determination, where performed, may be limited to a representative sample of the exposed employees who the employer reasonably believes are exposed to the greatest airborne concentrations of lead in the workplace.

## **Historical Data**

Where WESTON has previously monitored for lead exposures, such earlier monitoring results may be used to satisfy the requirements of initial monitoring and monitoring frequency, if the sampling and analytical methods meet the accuracy and confidence levels as indicated in paragraph of 29 CFR

1926.62(d)(9). Additionally, the data must have been obtained within the past 12 months during work operations conducted under workplace conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the current operations.

### **Objective Data**

Where objective data demonstrates that a particular product or material containing lead or a specific process, operation or activity involving lead cannot result in employee exposure to lead at or above the AL during processing, use, or handling, such data may be relied upon instead of performing initial monitoring.

An accurate record documenting the nature and relevancy of objective data used in assessing employee exposure in lieu of exposure monitoring, must be maintained.

**Exception:** Objective data, as described above, is not permitted to be used for exposure assessment in connection with the specific activities previously discussed as "Trigger Tasks".

### **Positive Initial Determination and Initial Monitoring**

Where a determination shows the possibility of any employee exposure at or above the AL, monitoring must be conducted which is representative of the exposure for each employee in the workplace who is exposed to lead.

### **Negative Initial Determination**

Where a determination is made that no employee is exposed to airborne concentrations of lead at or above the AL a written record of such determination must be made.

### **Frequency**

If the initial determination reveals employee exposure to be below the AL, further exposure determination need not be repeated except as otherwise provided in the last paragraph of this section.

If the initial determination or subsequent determination reveals employee exposure to be at or above the AL, but at or below the PEL monitoring must be conducted at least every 6 months.

If the initial determination reveals that employee exposure is above the PEL, monitoring must be performed quarterly.

Whenever there has been a change of equipment, process, control, or personnel or a new task has been initiated that may result in additional employees being exposed to lead at or above the AL or may result in employees already exposed at or above the AL being exposed above the PEL, additional monitoring must be conducted in accordance with this practice.

### **Employee Notification**

Each employee shall be notified in writing of the results which represent that employee's exposure within five working days after completion of the exposure assessment.

Whenever the results indicate that the representative employee exposure, without regard to respirators, is at or above the PEL a written notice is required stating that the employee's exposure was at or above that

level and includes a description of the corrective action taken or to be taken to reduce exposure to below that level.

Exposure monitoring records must be maintained as required in 29 CFR 1926.62(n)(1). Minimum information includes:

- Sampling data and procedures utilized.
- Description of sampling and analytical methods used.
- Type of respiratory protection used.
- Name, social security number, job classification for specific persons monitored and/or representative groups.
- Any environmental variables which could impact measurements.

### **Engineering Controls**

As in all cases of potential or known exposure to a hazardous environment, engineering controls are to be evaluated as to effectiveness and appropriateness under the site-specific circumstances. Controls must be listed in the site-specific Health and Safety Plan (HASP) and implemented as appropriate or feasible. Appropriate engineering controls include dust suppression, use of longer torches in cutting operations, use of mechanical shears in lieu of torches, vacuum blasting methods, and local ventilation.

### **Ventilation**

When mechanical ventilation is used to control lead exposure, the mechanical performance of the system must be evaluated and documented as to its effectiveness in controlling exposure.

### **Work Practice Controls**

WESTON will not use administrative controls such as worker rotation as a means of reducing employees' TWA exposure to lead unless expressly approved by a qualified safety professional.

### **General Housekeeping**

All surfaces shall be maintained as free as practicable of accumulations of lead.

Floors and other surfaces where lead accumulates shall, wherever possible, be cleaned by vacuuming or other methods that minimize the likelihood of lead becoming airborne.

Shoveling, dry or wet sweeping, and brushing may be used only where vacuuming or other equally effective methods have been tried and found ineffective.

Where vacuuming methods are selected, the vacuums shall be equipped with HEPA filters and used and emptied in a manner which minimizes the reentry of lead into the workplace.

Compressed air shall not be used to remove lead from any surface unless the compressed air is used in conjunction with a ventilation system designed to capture the airborne dust created by the compressed air.

## **Hygiene Facilities and Practices**

In control zone areas where employees are exposed to lead above the PEL without regard to the use of respirators, food or beverage shall not be present or consumed, tobacco products shall not be present or used, and cosmetics shall not be applied.

Clean change areas shall be provided for employees whose airborne exposure to lead is above the PEL, without regard to the use of respirators.

To prevent cross-contamination, change areas, as needed, shall be equipped with separate storage facilities for protective work clothing and equipment and for street clothes.

Employees exposed to lead concentrations greater than the AL shall not leave the workplace wearing any protective clothing or equipment that is required to be worn during the work shift.

Shower facilities shall be provided, where feasible, for use by employees whose airborne exposure to lead is above the PEL. Adequate supplies, cleansing agents, and towels shall be provided.

Lunchroom facilities or eating areas shall be as free as practicable from lead contamination and readily accessible to employees.

Employees whose airborne exposure to lead is above the PEL, without regard to the use of a respirator, must wash their hands and face prior to eating, drinking, smoking or applying cosmetics.

Employees shall not enter lunchroom facilities or eating areas with protective work clothing or equipment which has been contaminated by surface lead dust in concentrations exceeding the AL.

Adequate hand washing facilities shall be provided for use by employees exposed to lead in concentrations exceeding the AL. These facilities must be designed in accordance with 29 CFR 1926.51(f). Where showers are not provided, employees must wash their hands and face at the end of the work-shift.

**Note:** Short-term (less than one week) field activities may utilize appropriate personal decontamination sequences such as those allowed under 29 CFR 1910.120 (HAZWOPER) in lieu of contained clean rooms, showers and change facilities.

## **Personal Protective Clothing and Equipment**

Where exposures to lead above the AL (without regard to the use of respirators) have been validated by monitoring or where employees are exposed to lead compounds which may cause skin or eye irritation (e.g. lead arsenate, lead azide), and as interim protection for employees performing tasks as specified as “Trigger Tasks”, affected employees must use appropriate protective work clothing and equipment that prevents contamination of the employee and the employee's garments such as, but not limited to:

- Coveralls or similar full-body work clothing;
- Gloves, hats, and shoes or disposable shoe coverlets; and
- Face shields, vented goggles, or other appropriate protective equipment as necessary.
- Change areas in accordance with 29 CFR 1926.62(i)(2).
- Hand washing facilities in accordance with 29 CFR 1926.62(i)(5).

- Biological monitoring in accordance with 29 CFR 1926.62(j)(1)(i), to consist of blood sampling and analysis for lead and zinc protoporphyrin levels, and;
- Training as required under 29 CFR 1926.62(l)(1)(i) regarding 29 CFR 1926.59, Hazard Communication; training as required under 29 CFR 1926.62(l)(2)(ii)(C), regarding use of respirators; and training in accordance with 29 CFR 1926.21, Safety training and education.

The HASPs and fixed facility operating procedures must list specific and appropriate PPE that will be utilized for each task involving known or potential exposure to lead or lead compounds.

PPE utilized will be disposable garments. Personnel in maintenance or fixed operations may use re-useable garments only under the direction and approval of a qualified safety professional.

Garments will be disposed of at the end of a shift or upon leaving a controlled zone whichever comes first. Under no conditions will any employee be allowed to take contaminated garments with the employee to his or her home.

Proper decontamination of re-usable equipment/PPE must be conducted prior to allowing these materials to leave the site.

Contaminated protective clothing which is to be cleaned, laundered, or disposed of, must be placed in a closed container in the change area which prevents dispersion of lead outside the container.

Containers of contaminated (defined as when exposures are greater than or equal to the PEL) protective clothing and equipment must be labeled as follows:

"Caution: Clothing contaminated with lead. Do not remove dust by blowing or shaking. Dispose of lead contaminated wash water in accordance with applicable local, state, or federal regulations."

The removal of lead from protective clothing or equipment by blowing, shaking, or any other means which disperses lead into the air shall be prohibited.

## **Respirators**

For WESTON operations, respirators shall be used in accordance with WESTON's Respiratory Protection Program in the following circumstances:

- Whenever an employee's exposure to lead exceeds the AL;
- In work situations in which engineering controls and work practices are not sufficient to reduce exposures to or below the AL;
- Whenever an employee requests a respirator; and
- As interim protection for employees performing "Trigger-tasks".

Respirators approved for use are limited to:

- Properly fitted half-face APRs with high-efficiency filters for concentrations not exceeding 500µg/m<sup>3</sup>.

- A loose fitting hood or helmet PAPR with N, R, or P100 filter cartridges; a hood or helmet supplied air respirator operated in continuous flow mode (e.g. type CE abrasive blasting helmet operated in continuous flow mode for concentrations not to exceed 1250  $\mu\text{g}/\text{m}^3$ ).
- Properly fitted full-face APRs with high efficiency filters for concentrations not in excess of 2,500  $\mu\text{g}/\text{m}^3$ .
- Tight fitting full-facepiece PAPRs with high-efficiency filters for concentrations not in excess of 2,500  $\mu\text{g}/\text{m}^3$ .
- Full-facepiece, positive-pressure supplied air respirators (SARs) for concentrations not in excess of 100,000  $\mu\text{g}/\text{m}^3$ .
- Full-facepiece self-contained breathing apparatus (SCBA) for concentrations greater than 100,000  $\mu\text{g}/\text{m}^3$  or for unknown concentrations.

Respirators specified for higher concentrations can be used at lower concentrations of lead.

A full facepiece is required if the lead aerosols cause eye or skin irritation at the use concentrations.

Fit-testing must be conducted in accordance with WESTON's Respiratory Protection Program and 29 CFR 1910.134.

### **Signs and Labels**

The following warning signs shall be posted in each work area where exposure to lead is above the PEL.

WARNING

LEAD WORK AREA

POISON

NO SMOKING OR EATING

Signs required by this paragraph must be illuminated and cleaned as necessary so that the legend is readily visible from all areas of approach to the work area.

### **Medical Surveillance**

Initial medical surveillance in the form of blood testing shall be made available to employees occupationally exposed on any day to lead at or above the AL.

Biological monitoring in the form of blood sampling and analysis for lead and zinc protoporphyrin levels will be performed during initial medical surveillance and must be performed on the following schedule:

- For any employee anticipating work at a site or operation where the known or potential exposure (without regard to the use of respiratory equipment) equals or exceeds the AL, biological monitoring must be conducted prior to the start of that person's work on site or within 48 hours of such determination. Post-site work monitoring must be conducted within one week of that person's completion of site work. NOTE: This initial determination and need for blood testing should be reviewed by a Certified Industrial Hygienist; particularly if a negative determination is made. Appropriate documentation must be placed in the site files for future reference.

- During long-term (greater than 30 days) site activities for each employee with known or potential exposure to or greater than the AL for 30 or more days per year, at least every 2 months for the first 6 months and every 6 months thereafter.

Within 5 working days after the receipt of biological monitoring results, WESTON's medical consultant will notify each employee in writing of his or her blood lead level. The content of and review mechanisms for medical examinations made available shall be pursuant to 29 CFR 1926.62(j).

For any employee found to have a blood lead level at or above 40µg/100g of whole blood, testing will be performed every 2 months until two consecutive blood samples and analysis indicate a blood lead level below 40µg/100g of whole blood.

### **Medical Removal and Protection**

WESTON will temporarily remove an employee from work having an exposure to lead at or above the AL on each occasion that a periodic and a follow-up blood sampling test conducted pursuant to 29 CFR 1926.62(k) indicate that the employee's blood lead level is at or above 50 µg/dl.

WESTON will remove an employee from work having an exposure to lead at or above the AL on each occasion that a final medical determination results in a medical finding, determination, or opinion that the employee has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to lead.

**Note:** Medical removal protections shall be strictly as interpreted under 29 CFR 1926.62(k) and other applicable Acts or Standards.

In the event any employee must be removed from work activities due to blood lead levels records and documents must be maintained in the project files as required in 29 CFR 1910.1025(n) or 1926.62(n).

### **Education and Training**

All WESTON personnel with potential occupational exposure to lead will be provided with training, initially and annually thereafter, as to:

- Content of the standards 29 CFR 1910.1025 and 1926.62.
- The nature of operations which could result in exposure at or above the action level on any one day.
- Respirator use, selection and maintenance.
- Medical surveillance and medical removal requirements and protections.
- Health effects of lead.
- Engineering and work practice controls.
- WESTON's Lead Exposure Compliance Program and associated site specific plans.

### **Recordkeeping and Training**

Documentation of training records in the form of training materials and attendance sheets will be maintained in the project files.

## **Exposure Assessments**

Monitoring and data sheets used to determine employee exposures must be maintained on all sites with lead exposure. As required under 29 CFR 1910.20, copies of all documentation must be maintained in the project files.

Exposure assessment and monitoring records must include:

- The date(s), number, location and results of samples taken.
- The determination that the sampling procedures are representative of employee exposure.
- A description of the sampling and analytical procedures used.
- The type of respiratory protection used, if any.
- The name, employee number, and job classification of the employee(s) monitored.
- Environmental conditions encountered.

Objective data which is or will be used for determining exemption from initial monitoring as allowed under 29 CFR 1926.62(d)(3) must be maintained in the project files. Objective data utilized is required to be maintained for a period of at least 30 years.

## **Medical Surveillance**

Medical surveillance will be conducted and records will be maintained in accordance with WESTON's Occupational Medical Monitoring Program requirements as indicated in 29 CFR 1910.1025(n) and/or 1026.62(n).

## **Task Specific Methods of Control**

Based upon WESTON policy, each site activity involving potential exposure to lead must be identified and analyzed through a Task/Risk Analysis as a part of the site-specific HASP. This Task/Risk Analysis must identify methods, materials and equipment utilized in limiting exposure. Appendix 1 provides Actions/Requirements Based on Task. Appendix 2 provides a Task/Risk Analysis Inspection Checklist.

Current HASP forms can be obtained through the Division Environmental Health and Safety Manager, Corporate Environmental Health and Safety or on the WESTON EHS Portal Site.

## **Hazard Communication and Multi-Employer Sites**

On multi-employer sites where the activities of one contractor/employer will or may have a direct impact with potential exposure to other contractors/employers, the Site Manager is responsible for contacting a representative of the potentially affected parties. The Site Manager will inform them of the lead exposure potential, control methods utilized, protective procedures to be followed, and the limits of lead contamination as known.

## **Inspections and Audits**

The Project Manager is responsible for providing (at a minimum) weekly documented inspections of the work site. In accordance with the requirements of the lead standard these inspections must encompass all areas of the site where exposure to lead is at or above the PEL (Appendix 2). Additionally, any equipment, PPE, signs, and decontamination or disposal operations must be evaluated as to compliance with the standard and WESTON Policy regardless of the exposure concentration. Any non-compliance must be noted and corrected.



## **APPENDIX 1**

### **ACTIONS/REQUIREMENTS BASED UPON TASK:**

**1. Exposure Less than Action Level (AL):**

- Initial Exposure Assessment
- Hand Washing Facilities
- Proper Housekeeping
- Medical Removal Protection

**2. Exposure at or over AL but less than Permissible Exposure Limit (PEL):**

- Initial Exposure Assessment
- Hand Washing Facilities
- Periodic Exposure Monitoring
- Biological Monitoring and Recordkeeping
- Annual Training
- Proper Housekeeping
- Medical Removal Protection

**3. Exposure at or over AL but less than the PEL (30 or more days/year):**

- As above and
- Medical Examinations and Recordkeeping

**4. Exposure at or greater than the PEL:**

- Initial Exposure Assessment
- Hand Washing Facilities
- Periodic Exposure Monitoring
- Biological Monitoring and Recordkeeping
- Annual Training
- Proper Housekeeping
- Appropriate Respiratory Protection
- Warning Signs
- Proper PPE
- Proper Change Areas
- Decontamination Facilities/Showers as feasible
- Separate Eating Areas
- Medical Examinations and Recordkeeping
- Medical Removal Protection

**5. Exposure to Trigger Tasks (until exposure is verified):**

- See requirements under greater than PEL exposure

**APPENDIX 2**  
**TASK/RISK ANALYSIS AND INSPECTION CHECKLIST**  
**FOR ACTIVITIES WITH POTENTIAL FOR LEAD EXPOSURE**

This task involves the known or potential risk of exposure to lead or lead-containing materials. As such, requirements as indicated in 29 CFR 1910.1025 or 29 CFR 1926.62 and WESTON's Written Lead Exposure Compliance Program (FLD 46) will be followed.

**Task Description:**


**Equipment Required/Used:**


**Training Required/Used:**


**Initial Exposure Determination: (Indicate Method[s] Used)**

	Personal Sampling
	Objective Data (attach or indicate location of data)
	Historical Data (attach or indicate location of data)

**PPE Includes:**

	Respiratory Protection (specify)		Shoes or Shoe Covers (specify)
	Coveralls (disposable)		Face Shield, Goggles or Safety Glasses (specify)
	Coveralls (reusable)		Other (specify)
	Gloves (specify)		
	Head Covering (specify)		

**Inspection Items:**

Y/N	Item/Action
	Personnel are wearing appropriate PPE.
	PPE is in good condition.
	PPE is removed and disposed of in a manner to preclude airborne release of lead or lead compounds.
	Will clothing be laundered?
	If yes, then ensure notification of vendor as required.
	Will clothing be disposed of?
	If yes, container of disposable clothing and contaminated materials is closed and appropriately labeled.
	All surfaces are maintained (as practicable) free of lead or lead compounds.
	Appropriate methods and procedures are used for cleanup of surfaces with lead contamination.
	If vacuum is utilized, it is equipped with appropriate HEPA filter.
	If exposure is known or suspect to be at or greater than the PEL, then:
	There is no eating, drinking, cosmetic application, or tobacco consumption in contaminated areas.
	Change areas are available.
	Change areas are maintained to prevent cross-contamination of work and street clothing.
	No work clothing which has been known or is potentially contaminated is allowed to be worn off-site or in on-site clean areas.
	Clean, sanitary showers (where feasible) are maintained.
	All personnel shower prior to leaving the site at end of shift.
	Clean, sanitary eating areas are provided.
	Hand washing facilities are provided in all cases.
	Personnel are required to wash hands and face upon leaving the contaminated area.

**Comments:**

## **FLD 49 SAFE STORAGE OF SAMPLES**

### **REFERENCE**

DOT Emergency Response Guide (ERG)

To ensure that multi-media samples collected in the course of WESTON work assignments are not stored in a manner that creates undue hazard to WESTON employees or others.

### **PROCEDURE**

Samples that are transported from a WESTON work location must be classified and packaged in compliance with U.S. Department of Transportation (DOT) regulations or alternatively in accordance with International Air Transport Association (IATA) regulations. WESTON's manual of Procedures for Shipping and Transporting Dangerous Goods must be consulted to determine if the samples will be classified as either "environmental" or "hazardous materials" samples.

#### **Environmental Samples**

Environmental samples are not subject to DOT or IATA dangerous goods regulations and must be packaged to protect their integrity during transportation and temporary storage and should have appropriate chain-of-custody documentation. These samples may be brought to a WESTON office location or rented space to verify sample documentation and repackaging (e.g., with ice or cold packs). Minor spill clean-up capability is required.

Once secured for shipment, these samples can be temporarily stored for the next day ground or air shipment pick-up. Under no circumstances are samples to be stored beyond the time necessary to arrange for transportation to a laboratory.

#### **Hazardous Materials Samples**

These samples are subject to DOT and/or IATA dangerous goods regulations and must be packaged and labeled according to the appropriate regulations, including completed chain-of-custody documentation prior to being transported from the WESTON work site. WESTON drivers must have the documentation for the samples and a DOT Emergency Response Guide (ERG) readily available in the vehicle. The ERG is available on-line at: <http://hazmat.dot.gov/pubs/erg/gydebook.htm> and appropriate sections can be copied to accompany samples being transported by vehicles driven by WESTON employees.

Under normal circumstances these samples should be shipped from the field and never brought back to a WESTON office location or into a rented space. If it is not possible to ship the samples from the field during the same day they are collected, a properly packaged, labeled, and sealed sample shipping container may be brought back to a WESTON office location for shipment to a laboratory the next business day - provided the temporary storage location is secure from access by any personnel who are not trained in shipping hazardous materials. Under no circumstances are samples to be stored in rented space; if necessary, secure temporary storage in a locked vehicle may be authorized. Note that some office leases do not permit the storage of hazardous materials and the lease will govern whether such materials can be stored overnight.

## **INSPECTION FOLLOW-UP**

Shipping procedures for samples should be included in the site-specific health and safety plan (HASP) and reviewed for compliance with these procedures prior to approval. EHS audits will include a review to sample shipping and storage procedures.